US009317179B2

(12) **United States Patent**
Ho

(10) **Patent No.: US 9,317,179 B2**
(45) **Date of Patent: Apr. 19, 2016**

(54) **METHOD AND APPARATUS FOR PROVIDING RECOMMENDATIONS TO A USER OF A CLOUD COMPUTING SERVICE**

(75) Inventor: **Edwin Ho**, Palo Alto, CA (US)

(73) Assignee: **SAMSUNG ELECTRONICS CO., LTD.**, Suwon-si (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **13/443,365**

(22) Filed: **Apr. 10, 2012**

(65) **Prior Publication Data**

US 2013/0218961 A1 Aug. 22, 2013

Related U.S. Application Data

(63) Continuation-in-part of application No. 12/761,313, filed on Apr. 15, 2010, now Pat. No. 7,937,451, which is a continuation-in-part of application No. 12/355,546, filed on Jan. 16, 2009, now Pat. No. 7,865,572, and a continuation-in-part of application No. 11/788,711, filed on Apr. 20, 2007, now Pat. No. 7,865,571, application No. 13/443,365, which is a continuation-in-part of application No. 12/414,548, filed on Mar. 30, 2009.

(60) Provisional application No. 61/563,320, filed on Nov. 23, 2011, provisional application No. 61/040,131, filed on Mar. 27, 2008, provisional application No. 60/879,416, filed on Jan. 8, 2007.

(51) **Int. Cl.**

G06F 15/16	(2006.01)
G06F 3/0482	(2013.01)
H04L 29/08	(2006.01)
G06F 17/30	(2006.01)
G06Q 30/02	(2012.01)
H04L 29/06	(2006.01)
H04L 12/58	(2006.01)
H04L 12/18	(2006.01)
H04W 56/00	(2009.01)

(52) **U.S. Cl.**

CPC ***G06F 3/0482*** (2013.01); ***G06F 17/30053*** (2013.01); ***G06F 17/30174*** (2013.01); ***G06Q 30/02*** (2013.01); ***H04L 12/1822*** (2013.01); ***H04L 51/32*** (2013.01); ***H04L 65/4084*** (2013.01); ***H04L 65/60*** (2013.01); ***H04L 67/04*** (2013.01); ***H04L 67/06*** (2013.01); ***H04L 67/10*** (2013.01); ***H04L 67/1095*** (2013.01); ***H04L 67/22*** (2013.01); ***H04L 67/26*** (2013.01); ***H04L 67/42*** (2013.01); ***H04W 56/001*** (2013.01)

(58) **Field of Classification Search**

USPC 709/204, 201

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,493,758	B1	12/2002	McLain
6,507,727	B1	1/2003	Henrick

(Continued)

FOREIGN PATENT DOCUMENTS

CN	1893356	A	1/2007
CN	101635635	A	1/2010

(Continued)

OTHER PUBLICATIONS

Examiners Report dated Nov. 20, 2012 for Japanese Application No. 2009545565 from Japan Patent Office, pp. 1-7, Tokyo, Japan (English-language translation included, pp. 1-4).

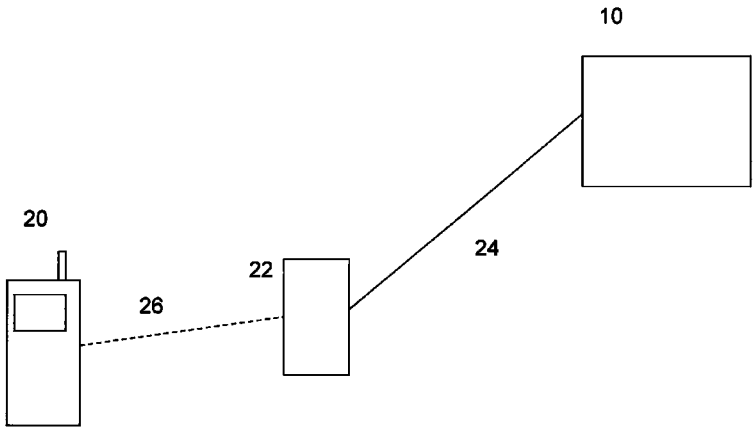
(Continued)

Primary Examiner — Vivek Srivastava
Assistant Examiner — Hermon Asres
(74) *Attorney, Agent, or Firm* — Sughrue Mion, PLLC

(57) **ABSTRACT**

A method and apparatus is disclosed for transferring digital content from a computing cloud to a computing device and generating recommendations for the user of the computing device.

24 Claims, 44 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

6,795,859	B2	9/2004	Parker	
6,810,080	B1	10/2004	Wise	
7,065,342	B1	6/2006	Rolf	
7,080,124	B1	7/2006	Shankar	
7,136,934	B2	11/2006	Carter et al.	
7,191,193	B2	3/2007	Ben-Yaacov et al.	
7,191,215	B2	3/2007	Ganesan	
7,281,034	B1	10/2007	Eyal	
7,370,063	B2	5/2008	Vilcauskas et al.	
7,403,769	B2	7/2008	Kopra et al.	
7,457,484	B2	11/2008	Wakeland	
7,523,136	B2	4/2009	Toorn et al.	
7,640,565	B2	12/2009	Zhang et al.	
7,642,443	B2	1/2010	Gould	
7,783,773	B2	8/2010	Wu	
7,805,129	B1	9/2010	Issa et al.	
7,865,571	B2	1/2011	Ho et al.	
7,865,572	B2	1/2011	Ho et al.	
7,937,451	B2	5/2011	Ho et al.	
8,082,321	B2	12/2011	Ho et al.	
8,122,479	B2	2/2012	Britt	
8,209,337	B2	6/2012	Park	
8,250,172	B2	8/2012	Ho et al.	
8,666,524	B2	3/2014	Ben-Yaacov et al.	
8,881,233	B2	11/2014	Chrysanthakopoulos et al.	
2002/0002039	A1	1/2002	Qurshey	
2005/0015467	A1	1/2005	Noda	
2005/0044235	A1	2/2005	Balahura et al.	
2006/0008180	A1	1/2006	Wakeland	
2006/0143297	A1	6/2006	Korhonen et al.	
2006/0173974	A1	8/2006	Tang	
2006/0184609	A1	8/2006	Deng	
2006/0184675	A1	8/2006	Salmre et al.	
2006/0227673	A1	10/2006	Yamashita et al.	
2006/0265738	A1	11/2006	Chrysanthakopoulos et al.	
2007/0121743	A1	5/2007	Zuckerman et al.	
2007/0180063	A1	8/2007	Qureshey et al.	
2008/0010372	A1	1/2008	Khedouri	
2008/0052371	A1	2/2008	Partovi et al.	
2008/0091763	A1	4/2008	Devonshire et al.	
2009/0043783	A1	2/2009	Wakasa et al.	
2009/0076821	A1*	3/2009	Brenner	G06F 17/30053 704/260
2009/0132526	A1*	5/2009	Park	G06F 17/30722
2009/0216620	A1*	8/2009	Lee	G06Q 30/02 705/14.49
2010/0257059	A1*	10/2010	Fujioka et al.	705/14.66
2010/0287033	A1*	11/2010	Mathur	G06F 17/30867 705/319
2011/0119364	A1*	5/2011	Zarkesh	709/223
2011/0208831	A1	8/2011	Ho et al.	
2011/0307791	A1*	12/2011	Pierre	G06Q 10/10 715/736
2012/0089702	A1	4/2012	Ho et al.	
2013/0007208	A1	1/2013	Tsui et al.	
2013/0290485	A1	10/2013	Ho et al.	

FOREIGN PATENT DOCUMENTS

CN	101681332	A	3/2010
EP	2149847	A1	2/2010
JP	2001297263		10/2001
JP	2002369174	A	12/2002
JP	2003284029	A	3/2003
JP	2003510734	A	3/2003
JP	2004054914		2/2004
JP	2004104704	A	4/2004
JP	2005130087		5/2005
JP	200601177		1/2006
JP	2006014177		1/2006
JP	2006268957		5/2006
JP	2006178741	A	7/2006
JP	2006-254241		9/2006
JP	2006254241		9/2006
JP	2006521761	A	9/2006
JP	2007164653		6/2007
JP	2007-213401		8/2007
JP	2007-265362		11/2007
JP	2007534009		11/2007
JP	2009-044374		2/2009
JP	2009-123102		6/2009
JP	2009-294775	A	12/2009
KR	10-2008-0022080	A	3/2008
KR	10-2008-0034084	A	4/2008
KR	10-2009-0051540	A	5/2009
WO	WO01/24474	A1	4/2001
WO	WO 2004/061547	A2	7/2004
WO	WO 2005/064945	A1	7/2005
WO	WO 2005/106876	A2	11/2005
WO	WO 2005/109224	A1	11/2005
WO	WO 2006/019608	A1	2/2006
WO	WO 2006/058149	A2	6/2006
WO	WO 2008/070062	A2	6/2008
WO	2009012901	A1	10/2009

OTHER PUBLICATIONS

Chinese Office Action dated Nov. 23, 2012 for Chinese Application No. 200880007398.A from Chinese Patent Office, pp. 1-17, Beijing, China (English-language translation included, pp. 1-14).

Korean Office Action dated Dec. 10, 2012 for Korean Application No. 2010-7024131 from Korean Intellectual Property Office, pp. 1-8, Seo-gu, Daejeon, 302-701, Republic of Korea (English-language translation included, pp. 5-8).

International Preliminary Report on Patentability dated Dec. 20, 2012 for International Application No. PCT/US2011/032372 from International Bureau of WIPO, pp. 1-6, Geneva, Switzerland.

European Search Report dated Mar. 4, 2010 for European Application No. EP 08705466 from European Patent Office, pp. 1-6, Rijswijk, Netherlands.

European Office Action dated Jun. 10, 2010 for European Application No. EP 08705466 from European Patent Office, pp. 1-4, Rijswijk, Netherlands.

International Search Report and Written Opinion dated Apr. 10, 2008 for International Application No. PCT/US2008/000055 from International Bureau of WIPO, pp. 1-6, ISA, United States.

International Search Report and Written Opinion dated May 27, 2009 for International Application No. PCT/US2009/038457 from International Bureau of WIPO, pp. 1-7, ISA, United States.

Supplementary European Search Report dated Apr. 7, 2011 for European Application No. 09725812.3 from European Patent Office, pp. 1-8, Rijswijk, Netherlands.

English-language translation of Chinese Office Action dated Jun. 9, 2011 for Chinese Application No. 200880007398.4 from Chinese Patent Office, pp. 1-12, Beijing, China.

English-language translation of Japanese Office Action dated Jul. 27, 2011 for Japanese Application No. 2009-545565 from Japan Patent Office, pp. 1-4, Tokyo, Japan.

European Office Action dated May 13, 2011 for European Application No. 08705466.4 from European Patent Office, pp. 1-5, Rijswijk, Netherlands.

Korean Notice of Preliminary Rejection dated May 31, 2012 for Korean Application No. 2010-7024131 from Korean Intellectual Property Office, pp. 1-5, Seo-gu, Daejeon, 302-701, Republic of Korea (English-language translation included, pp. 6-9).

European Office Action dated Mar. 21, 2012 for European Application No. 09725812.3 from European Patent Office, pp. 1-5, Rijswijk, Netherlands.

Chinese Office Action dated Jun. 5, 2012 for Chinese Application No. 200880007398.4 from Chinese Patent Office, pp. 1-7, Beijing, China (English-language translation included, pp. 8-19).

U.S. Non-Final Office Action mailed Dec. 15, 2009 for U.S. Appl. No. 11/788,711.

U.S. Final Office Action mailed Apr. 30, 2010 for U.S. Appl. No. 11/788,711.

U.S. Non-Final Office Action mailed Aug. 5, 2010 for U.S. Appl. No. 11/788,711.

(56) **References Cited**

OTHER PUBLICATIONS

U.S. Notice of Allowance mailed Nov. 1, 2010 for U.S. Appl. No. 11/788,711.
U.S. Non-Final Office Action mailed Apr. 5, 2010 for U.S. Appl. No. 12/355,546.
U.S. Non-Final Office Action mailed Aug. 5, 2010 for U.S. Appl. No. 12/355,546.
U.S. Notice of Allowance mailed Nov. 1, 2010 for U.S. Appl. No. 12/355,546.
U.S. Non-Final Office Action mailed Aug. 6, 2010 for U.S. Appl. No. 12/761,313.
U.S. Notice of Allowance mailed Dec. 27, 2010 for U.S. Appl. No. 12/761,313
U.S. Non-Final Office Action mailed Mar. 4, 2011 for U.S. Appl. No. 12/981,476.
U.S. Notice of Allowance mailed Aug. 22, 2011 for U.S. Appl. No. 12/981,476.
U.S. Notice of Allowance mailed Oct. 6, 2011 for U.S. Appl. No. 12/981,476.
U.S. Non-Final Office Action mailed Mar. 8, 2011 for U.S. Appl. No. 12/981,479.
U.S. Non-Final Office Action mailed Sep. 2, 2011 for U.S. Appl. No. 12/981,479.
U.S. Notice of Allowance mailed Apr. 2, 2012 for U.S. Appl. No. 12/981,479.
U.S. Non-Final Office Action mailed Feb. 6, 2012 for U.S. Appl. No. 13/332,196.
U.S. Non-Final Office Action mailed Oct. 12, 2012 for U.S. Appl. No. 13/332,196.
U.S. Non-Final Office Action mailed Jul. 25, 2011 for U.S. Appl. No. 13/098,404.
U.S. Non-Final Office Action mailed Apr. 13, 2012 for U.S. Appl. No. 13/098,404.
U.S. Non-Final Office Action mailed Dec. 27, 2012 for U.S. Appl. No. 13/098,404.
Japanese Office Action dated Nov. 7, 2013 for Japanese Application No. 2012-189845 from Japan Patent Office, pp. 1-4, Tokyo, Japan (English-language translation pp. 1-2).
Japanese Office Action dated Dec. 13, 2012 for Japanese Application No. 2011502073 from Japanese Patent Office, pp. 1-3, Japan (English-language translation included, pp. 1-3).
Canadian Office Action mailed Feb. 25, 2013 for Canadian Application No. 2,677,181 from the Canadian Intellectual Property Office, pp. 1-5, Quebec, Canada.
U.S. Notice of Allowance for U.S. Appl. No. 13/098,404 (357314-991159) mailed Apr. 25, 2013.
U.S. Final Office Action for U.S. Appl. No. 13/332,196 mailed Mar. 21, 2013.
U.S. Final Office Action for U.S. Appl. No. 13/332,196 mailed May 3, 2010.
Notification of Grant of Patent Right for Invention dated Jun. 21, 2013 for Chinese Application No. 200880007398.4 from Chinese Intellectual Property Office, pp. 1-2, Beijing, China (English language translation p. 1).
Japanese Office Action dated Jun. 12, 2013 for Japanese Application No. 2011-502073 from Japan Patent Office, pp. 1-8, Tokyo, Japan (English-language translation included, pp. 1-4).
U.S. Advisory Action for U.S. Appl. No. 13/332,196 mailed May 28, 2013.
U.S. Notice of Allowance for U.S. Appl. No. 13/332,196 mailed Jul. 17, 2013.
Japanese Appeal Decision dated Jul. 17, 2013 for Japanense Application No. 2009-545565 from Japan Patent Office, pp. 1-12 , Tokyo, Japan (English-language translation included, p. 1).
European Search Report dated Mar. 24, 2014 for European Serial No. 11769547.8 from the European Patent Office, pp. 1-9, Munich, Germany.
Japanese Office Action dated Dec. 26, 2013 for Japanese Application No. 2013-505113 from Japan Patent Office, pp. 1-7, Tokyo, Japan (English-language translation pp. 1-3).
Canadian Office Action dated Jan. 29, 2014 for Canadian Application No. 2,677,181 form Canadian Intellectual Property Office, pp. 1-3, Gatineau, Quebec, Canada.
Japanese Office Action dated Apr. 9, 2014 for Japanese Application No. 2013-084645 from Japan Patent Office, pp. 1-6, Tokyo, Japan (English-language translation pp. 1-3).
Japanese Decision of Grant dated Jul. 16, 2014 for Japanese Application No. 2012-189845 from Japan Patent Office, pp. 1-3, Tokyo, Japan.
Korean Office Action dated Jun. 27, 2014 for Korean Application No. 10-2012-7028641 from Korean Patent Office, pp. 1-13, Republic of Korea (English-language translation, pp. 8-13).
Korean Office Action dated Jun. 24, 2014 for Korean Application No. 10-2013-7003376 from Korean Patent Office, pp. 1-10, Republic of Korea (English-language translation, pp. 6-10).
Canadian Office Action mailed Jun. 23, 2014 for Canadian Application No. 2,796,119 from the Canadian Intellectual Property Office, pp. 1-3, Quebec, Canada.
Japanese Decision of Final Rejection dated Jul. 23, 2014 for Japanese Application No. 2013-505113 from Japan Patent Office, pp. 1-5, Tokyo, Japan (English-language translation pp. 1-2).
U.S. Non-Final Office Action for U.S. Appl. No. 13/567,516 mailed Sep. 16, 2014.
Communication issued on Mar. 18, 2015 by the European Patent Office in related Application No. 08705466.4.
Campbell et al., "Dig-Music: An on Demand Digital Musical Selection System Utilizing CATV Facilities", IEEE Transactions on Consumer Electronics, IEEE Service Center, vol. 53, No. 3, Aug. 1, 1982, 10 total pages, Cited in comm. issued on Mar. 18, 2015 in App. No. 08705466.4.
Essl et al., "Mobile STK for Symbian OS", Deutsche Telekom Laboratories, Tu-Berlin, 2006, 4 total pages, retrieved from <http://web.eecs.umich.edu/~gessl/georg_papers/icmc2006mobilestk.pdf> , Cited in comm. issued on Mar. 18, 2015 in App. No. 08705466.4.
Chinese Office Action mailed Oct. 10, 2014 for Chinese Application No. 201180027056.0 from the State Intellectual Property Office, pp. 1-23, Beijing, China (English-language translation included, pp. 1-16).
Japanese Final Office Action dated Oct. 27, 2014 for Japanese Application No. 2013-084645 from Japan Patent Office, pp. 1-6, Tokyo, Japan (English-language translation pp. 1-3).
U.S. Non-Final Office Action for U.S. Appl. No. 13/931,683 mailed Dec. 4, 2014.
Korean Notice of Final Rejection dated Jan. 14, 2015 for Korean Application No. 10-2013-7003376 from Korean Patent Office, pp. 1-11, Republic of Korea (English-language translation, pp. 7-11).
Communication dated Nov. 30, 2015, issued by the Japanese Intellectual Property Office in counterpart Japanese Application No. 2013-84645.
Communication dated Dec. 9, 2015, issued by the Korean Intellectual Property Office in counterpart Korean Application No. 10-2013-7003376.

* cited by examiner

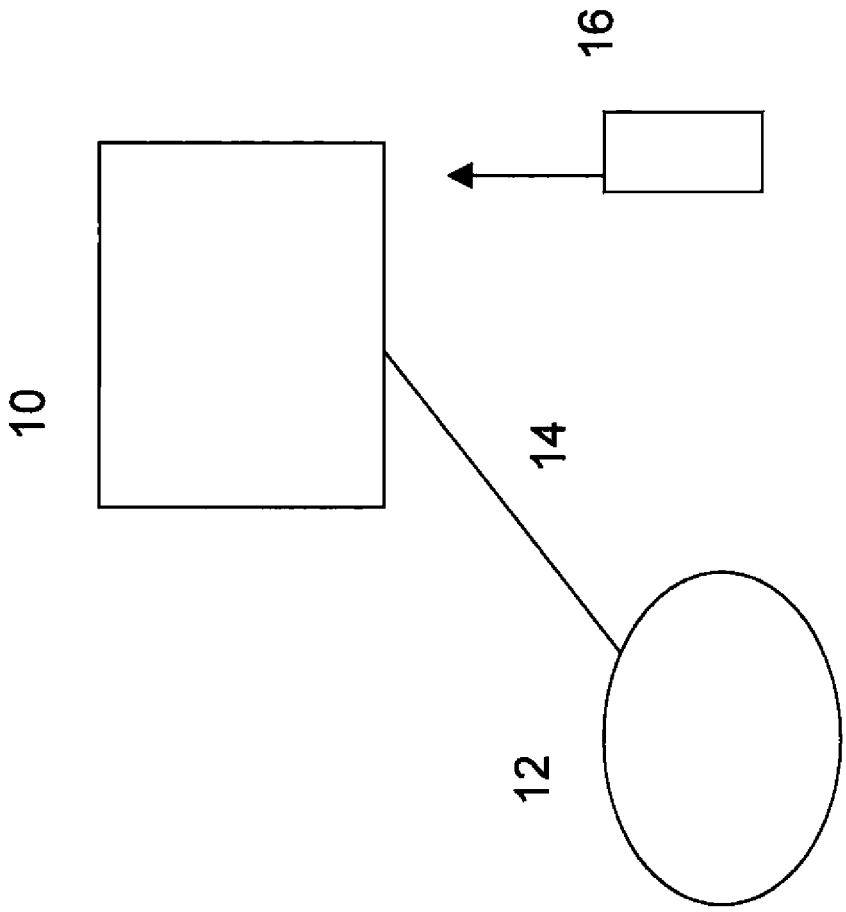


Figure 1: Prior Art

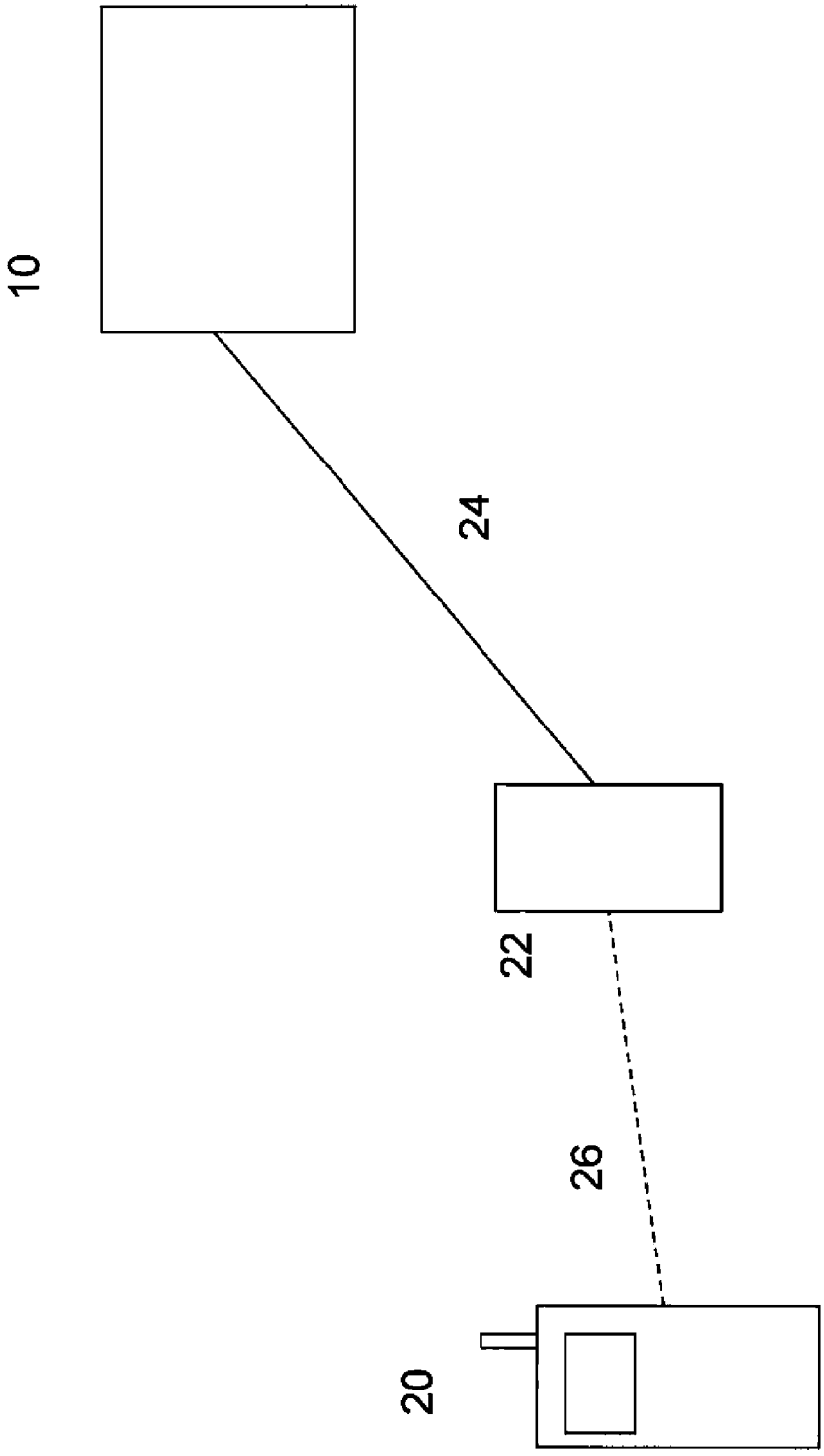


Figure 2A

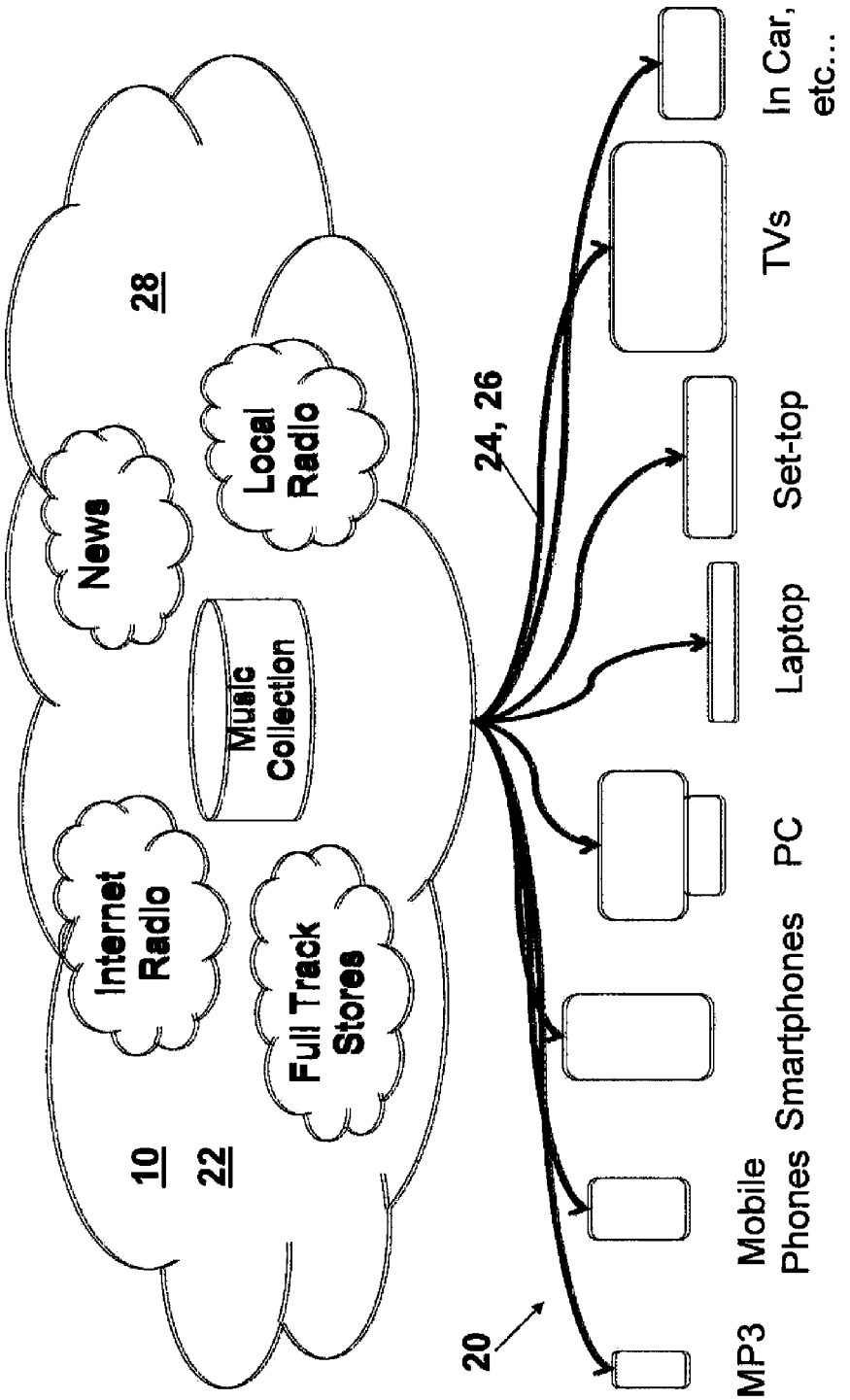

28
News
Local Radio
Music Collection
Internet Radio
Full Track Stores
10
22
20
24, 26
MP3
Mobile Phones
Smartphones
PC
Laptop
Set-top
TVs
In Car, etc...

Figure 2B

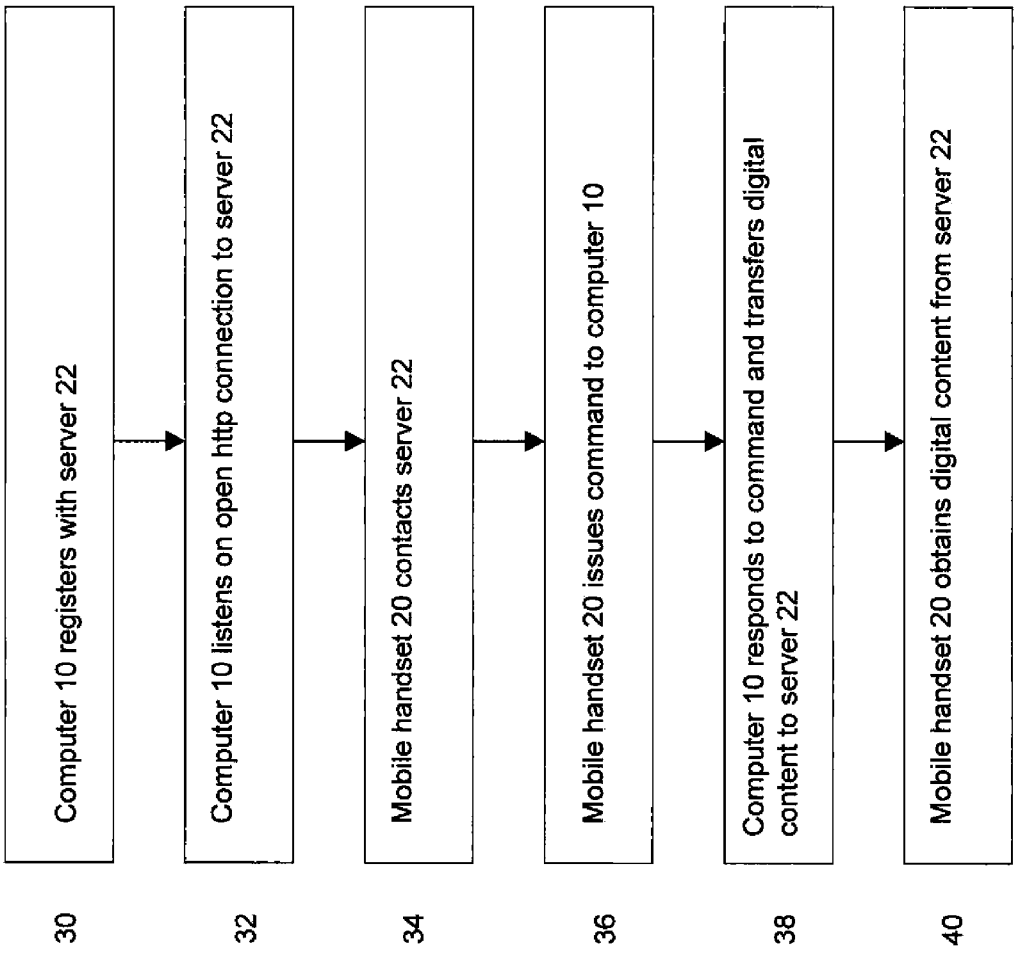

Computer 10 registers with server 22
30
Computer 10 listens on open http connection to server 22
32
Mobile handset 20 contacts server 22
34
Mobile handset 20 issues command to computer 10
36
Computer 10 responds to command and transfers digital content to server 22
38
Mobile handset 20 obtains digital content from server 22
40

Figure 3

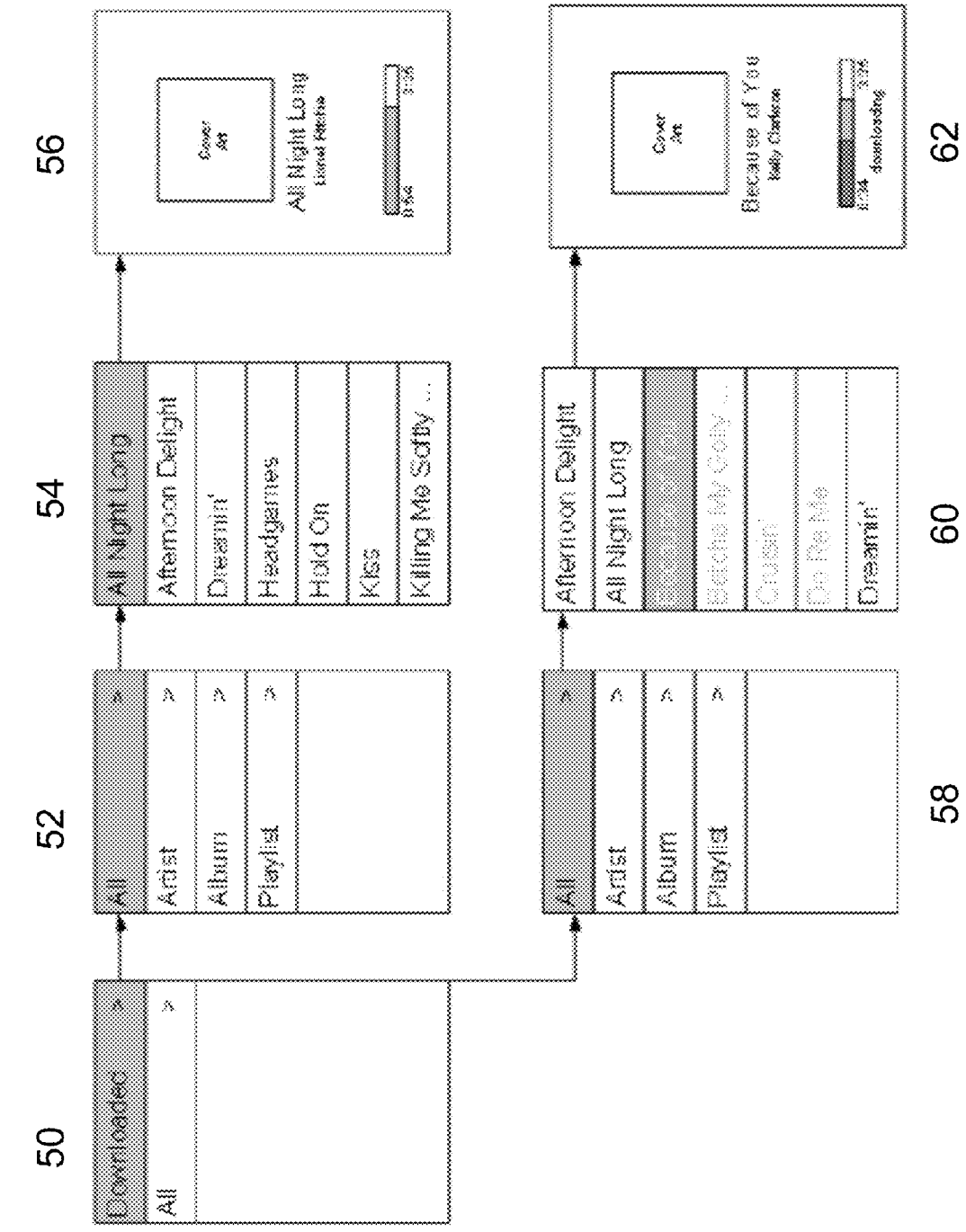

50
Downloaded
All
52
All
Artist
Album
Playlist
54
All Night Long
Afternoon Delight
Dreamin'
Headgames
Hold On
Kiss
Killing Me Softly ...
56
Cover Art
All Night Long
58
All
Artist
Album
Playlist
60
Afternoon Delight
All Night Long
62
Cover Art
Because of You

Figure 4

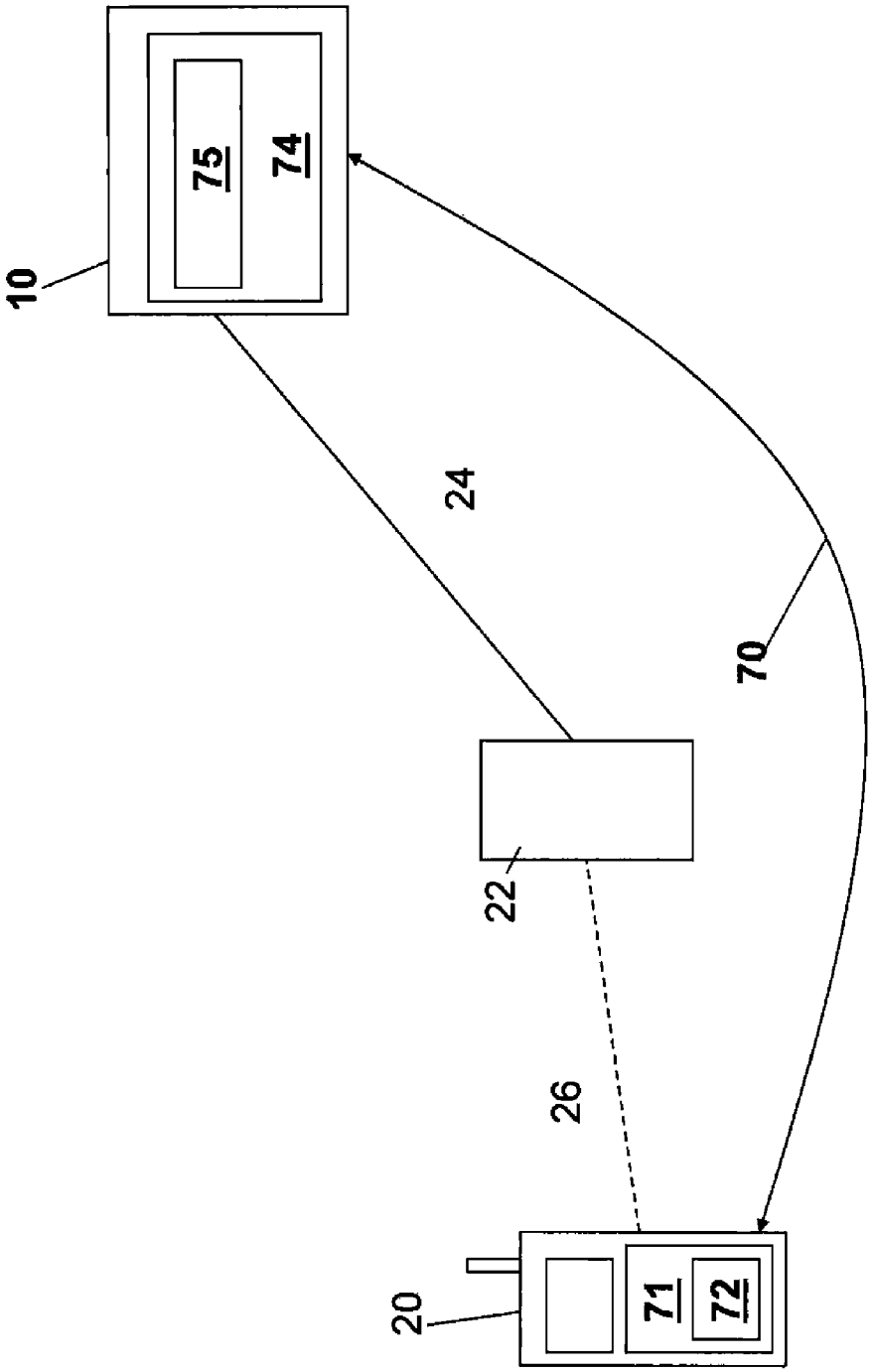


FIGURE 5

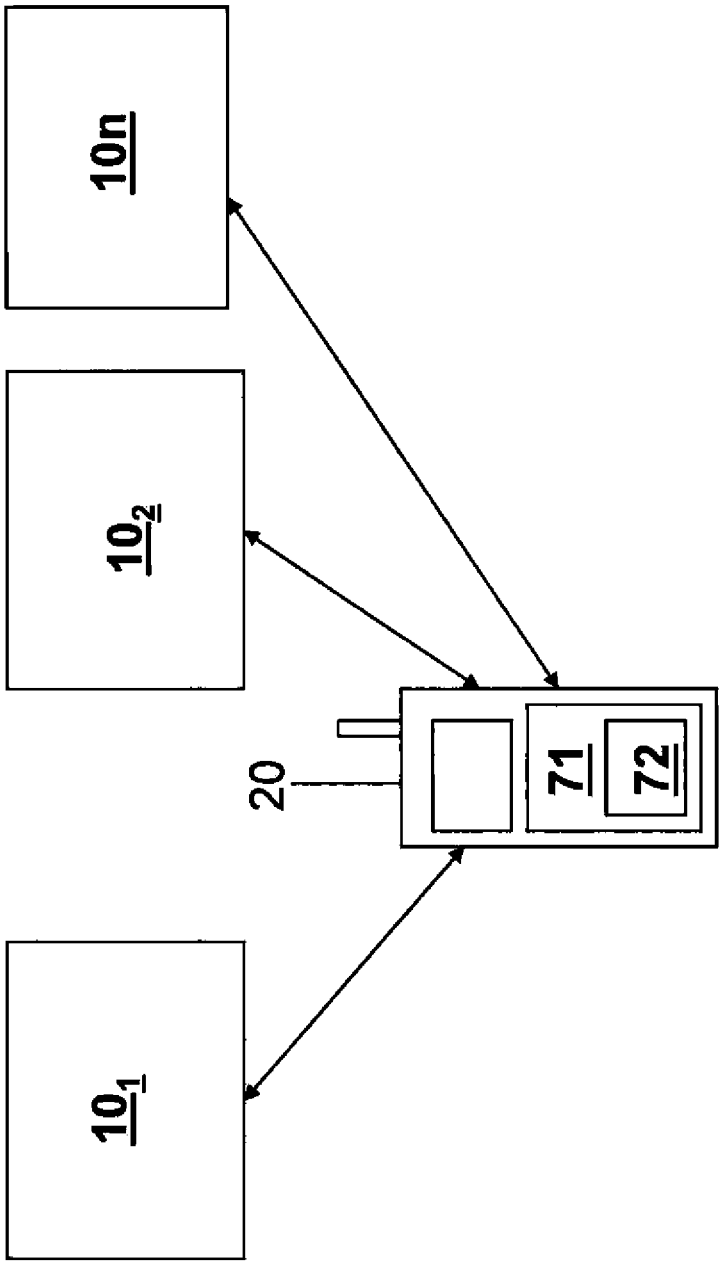


FIGURE 6

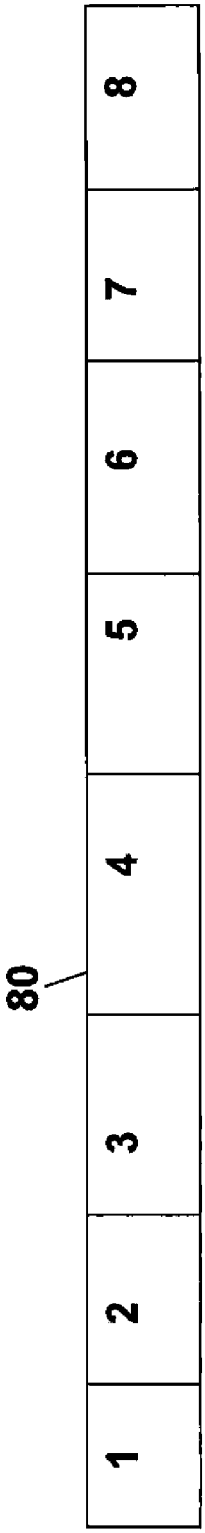
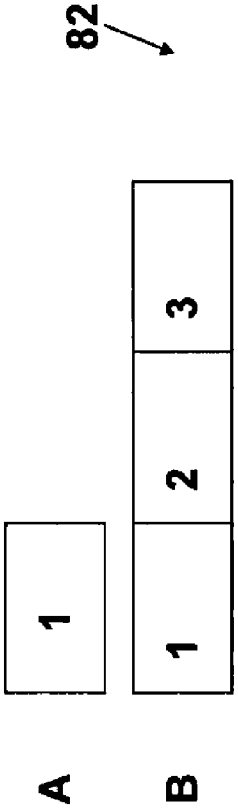
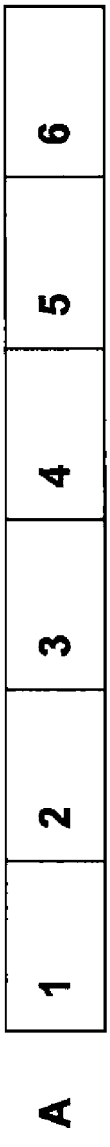


FIGURE 7A





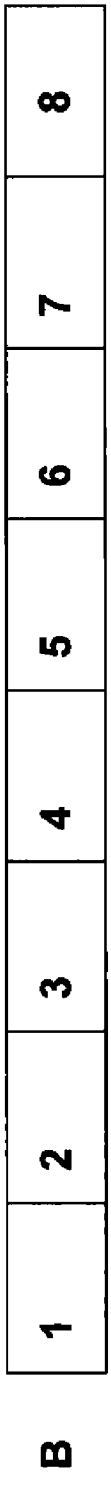


FIGURE 7B

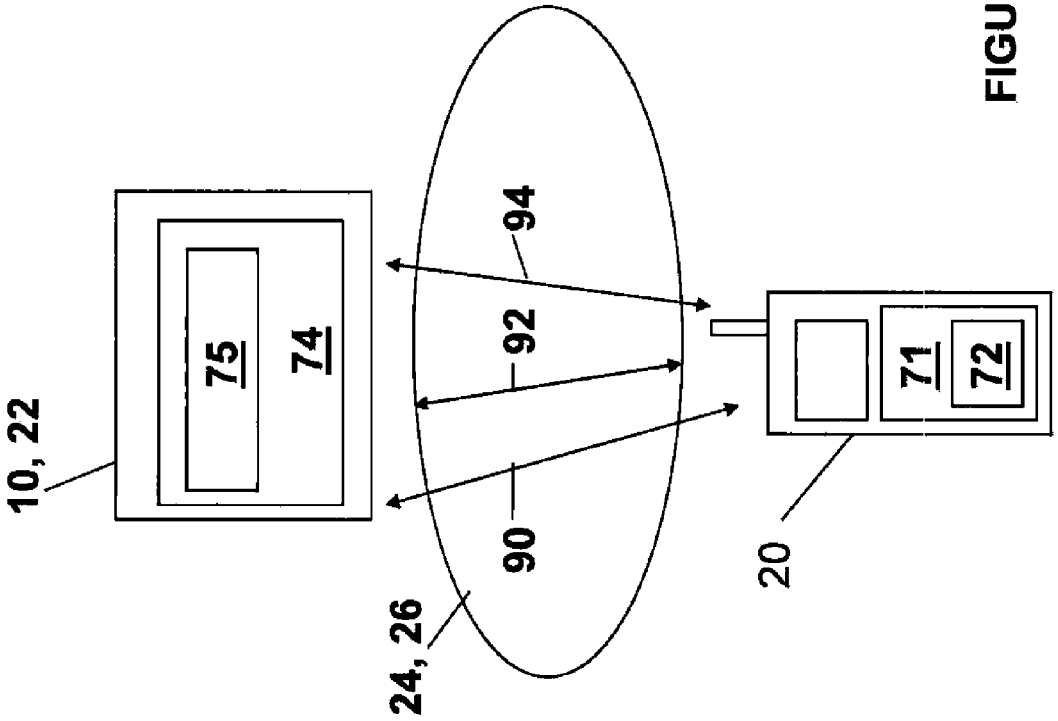


FIGURE 8

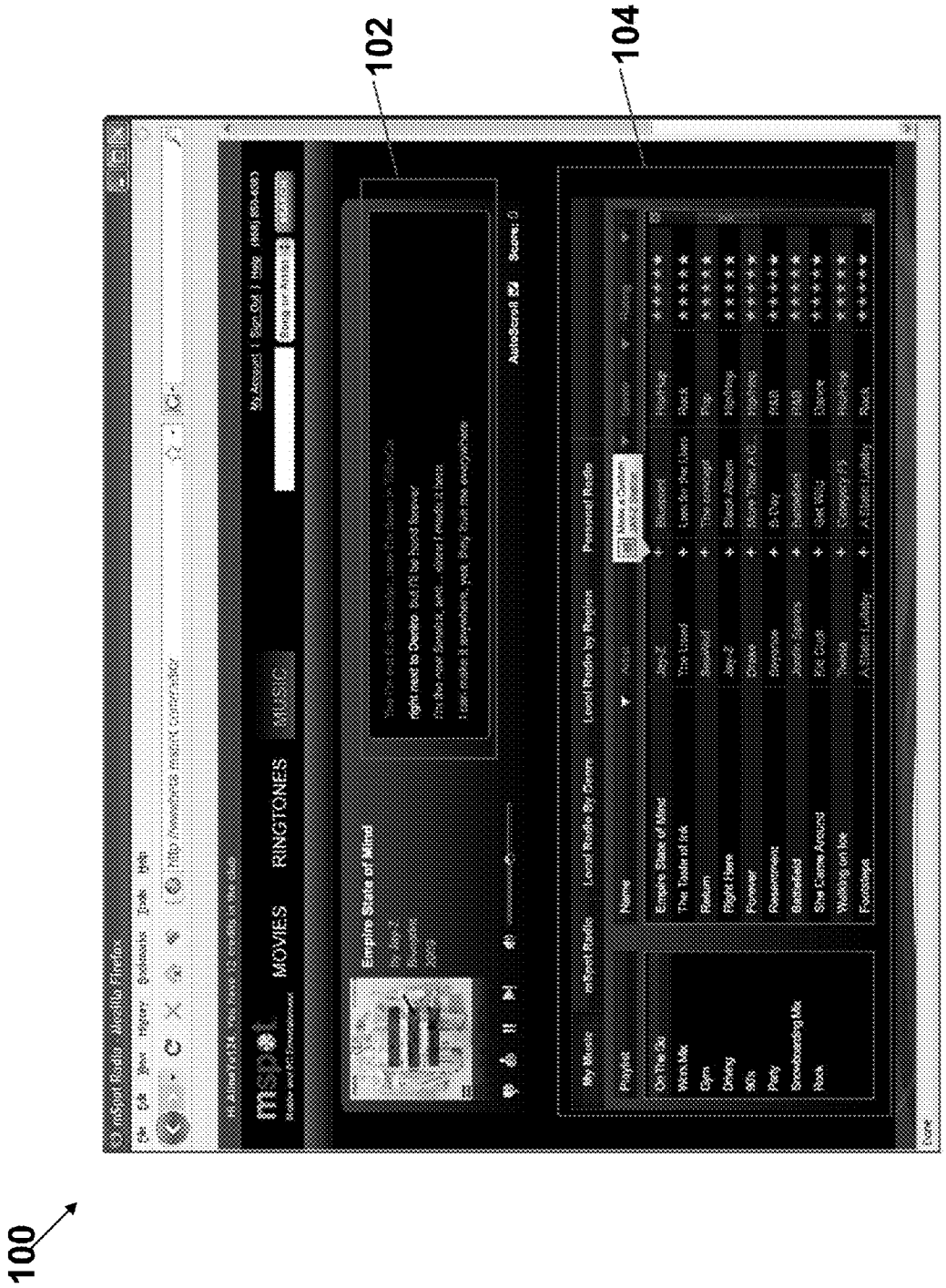


FIGURE 9

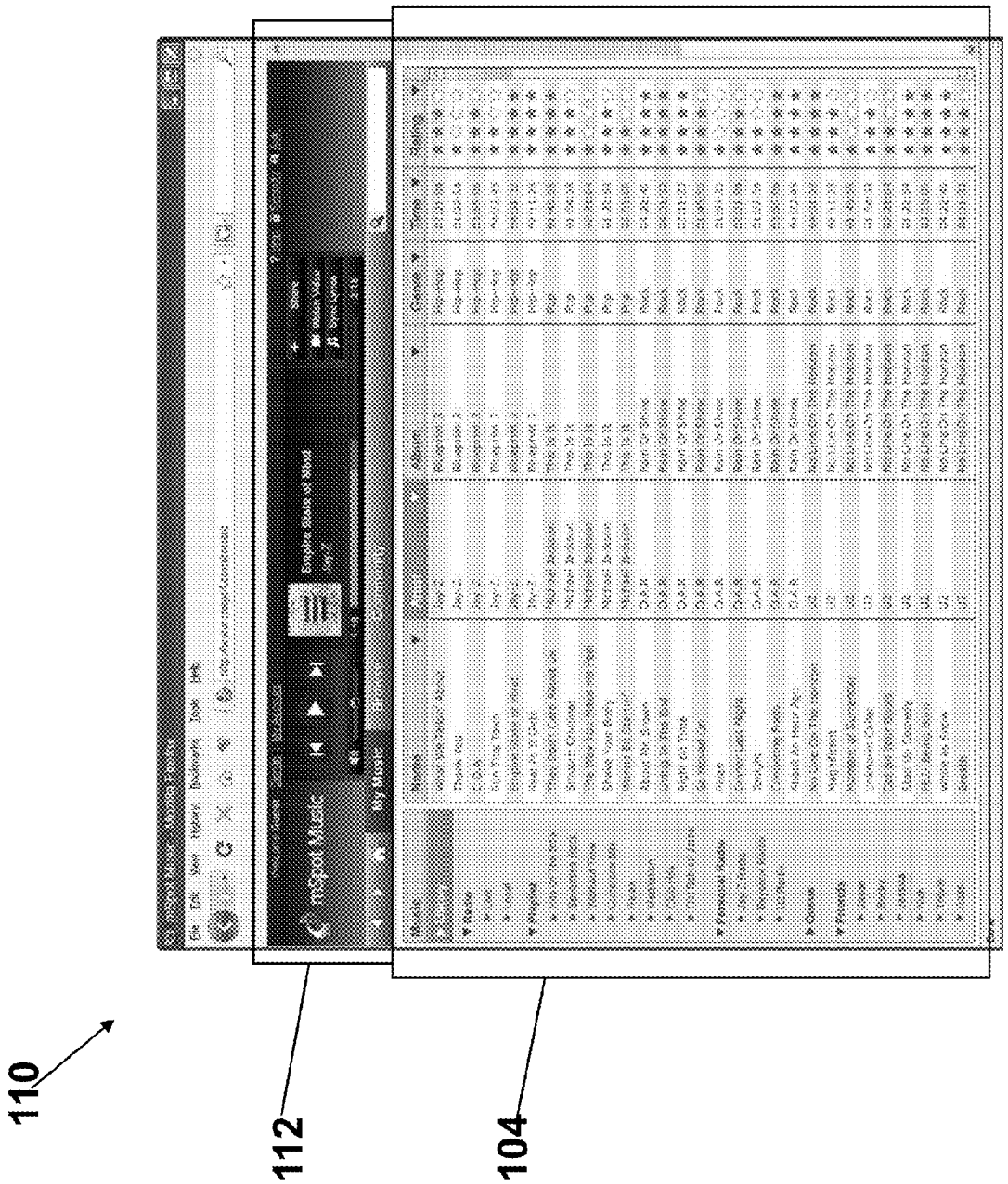


FIGURE 10

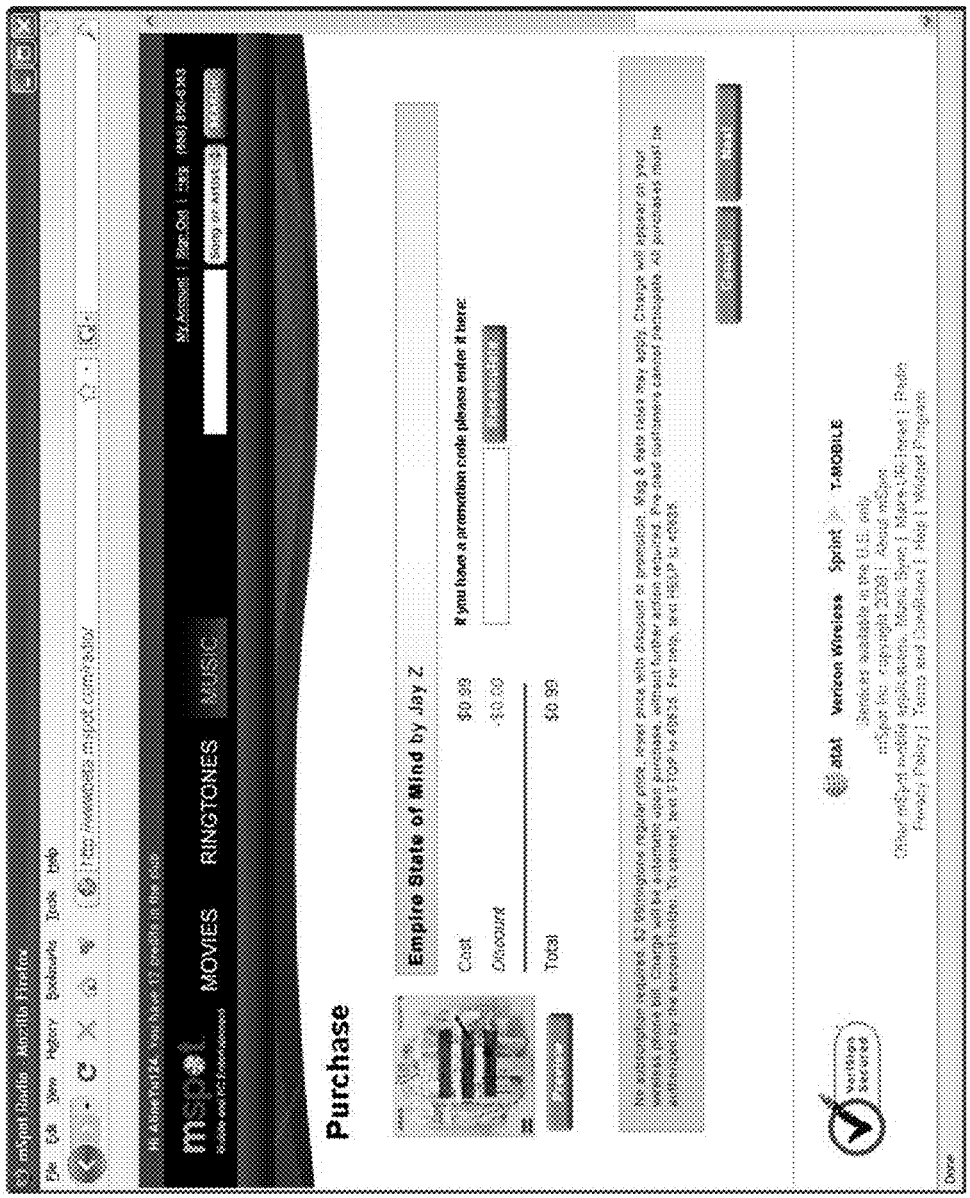

Purchase
Empire State of Mind by Jay Z
Cost
$0.99
Discount
-$0.00
Total
$0.99
If you have a promotion code please enter it here:
MOVIES
RINGTONES
MUSIC

FIGURE 11

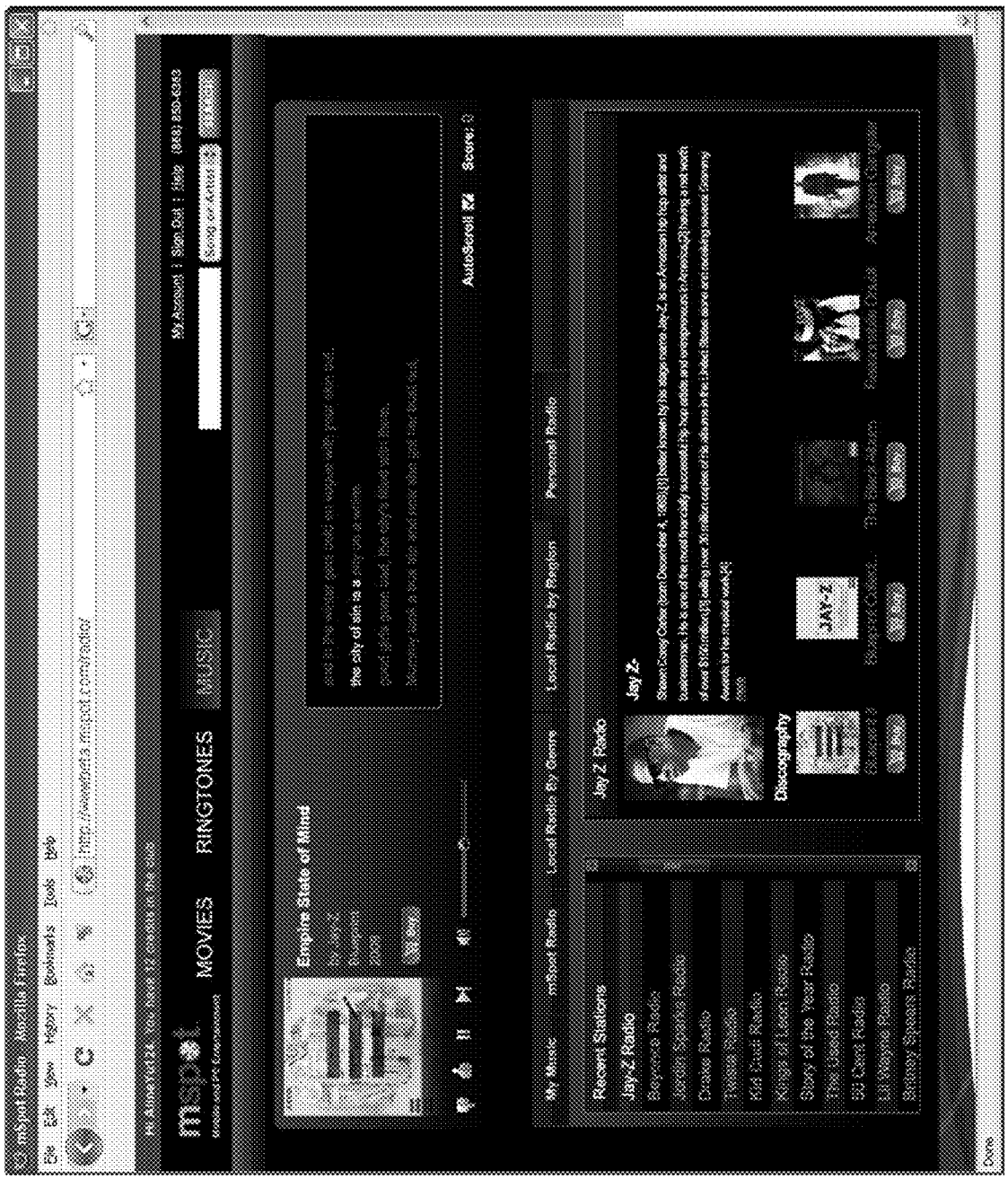
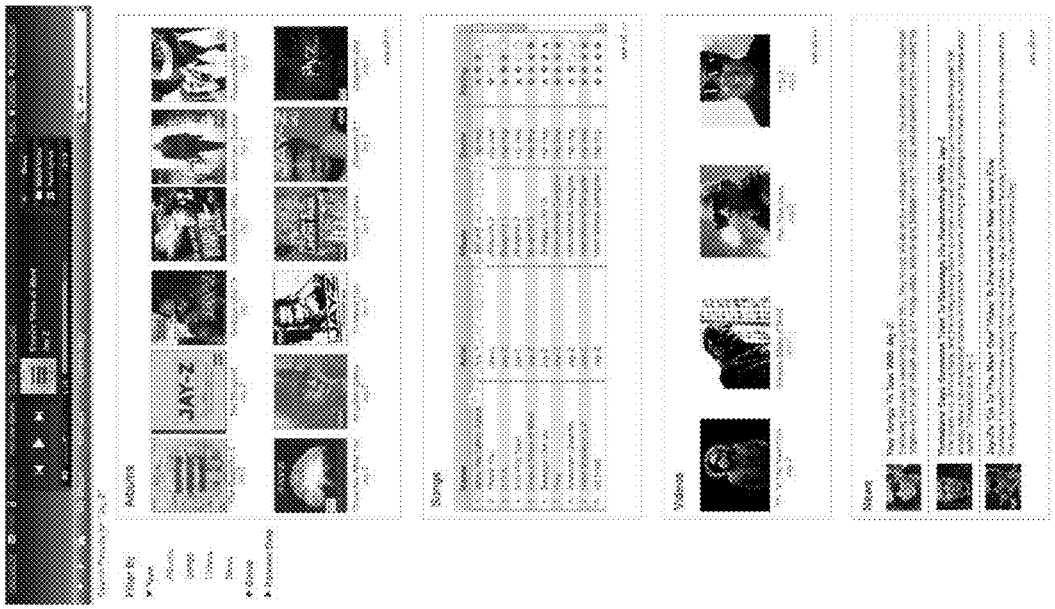

MOVIES
RINGTONES
MUSIC
Empire State of Mind
Jay Z Radio
Jay-Z
Discography
Recent Stations
Jay-Z Radio
Beyonce Radio
Jordin Sparks Radio
Drake Radio
Usher Radio
Kid Cudi Radio
Kanye West Radio
Story of the Year Radio
The Used Radio
50 Cent Radio
Lil Wayne Radio
Britney Spears Radio

FIGURE 12

Empire State of Mind
Local Radio By Genre
Local Radio by Region
Personal Radio
Name
Empire State of Mind
The Taste of Ink
Reborn
Right Here
Forever
Remembered
Scrubbed
She Came Around
Walking on Ice
Footsteps
Rock
Alt Rock / Lullaby
Classic Rock
Dance
Jazz
Pop
Rap
Rock
Soul
Sport Radio
My Music
Playlist
On The Go
Work Mix
Gym
Driving
90s
Party
Relationship Mix
Rock
AutoScroll
Score: 0

FIGURE 13



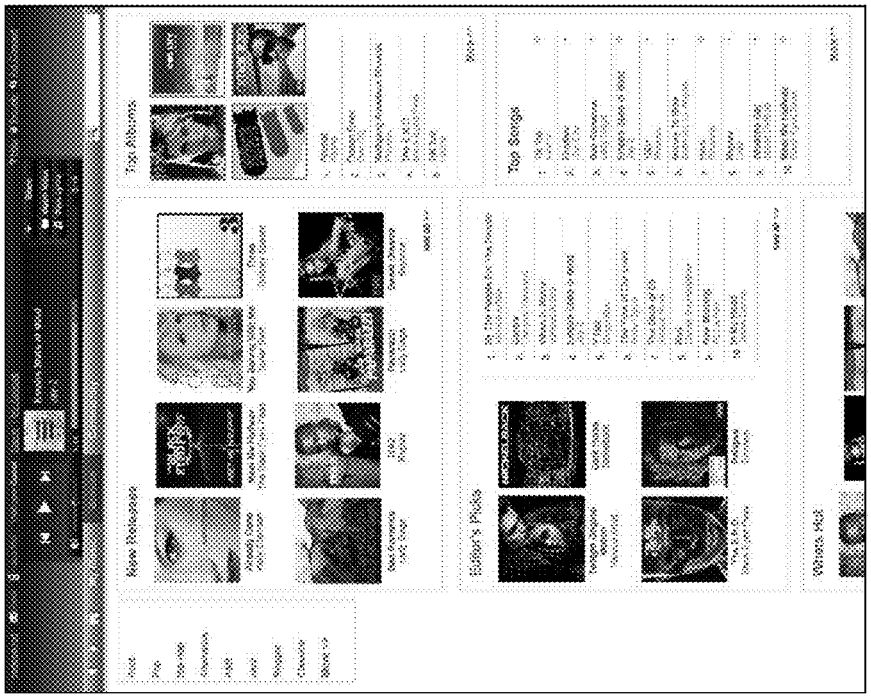


FIGURE 14

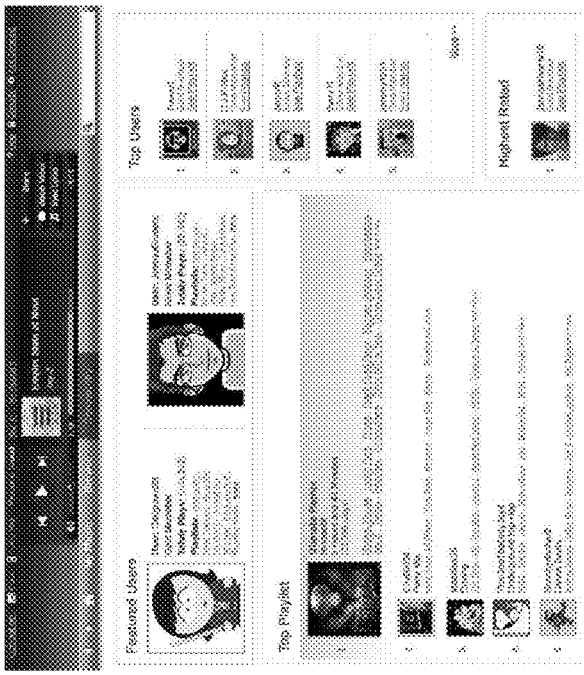


FIGURE 15

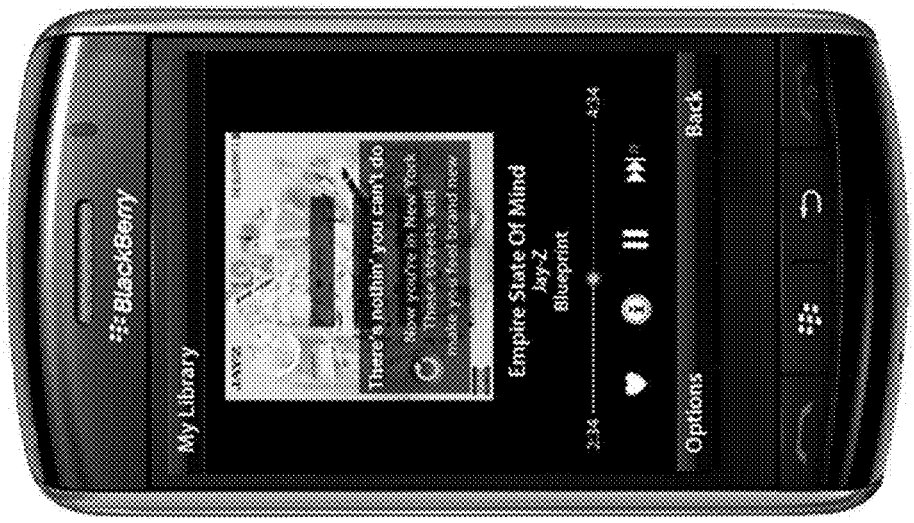


FIGURE 16B

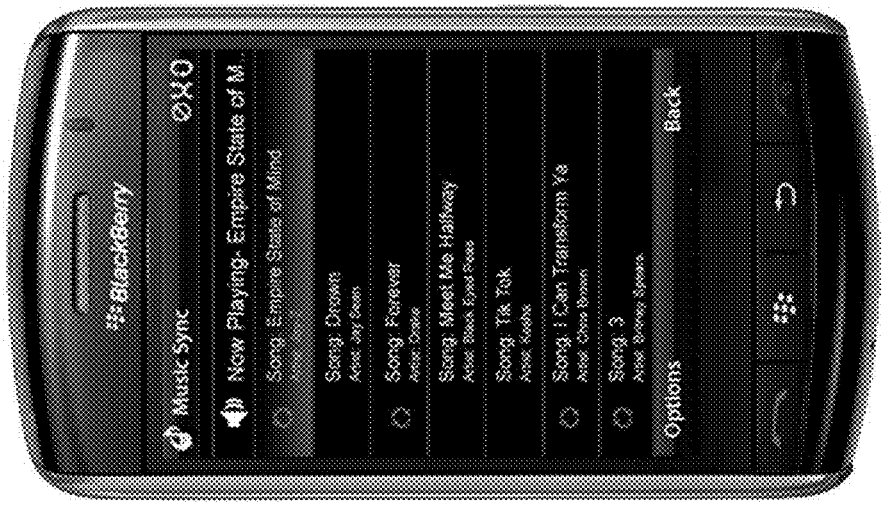


FIGURE 16A

Empire State of Mind - Jay-Z
Radio
Playlist
Personal Radio
Friends

FIGURE 17

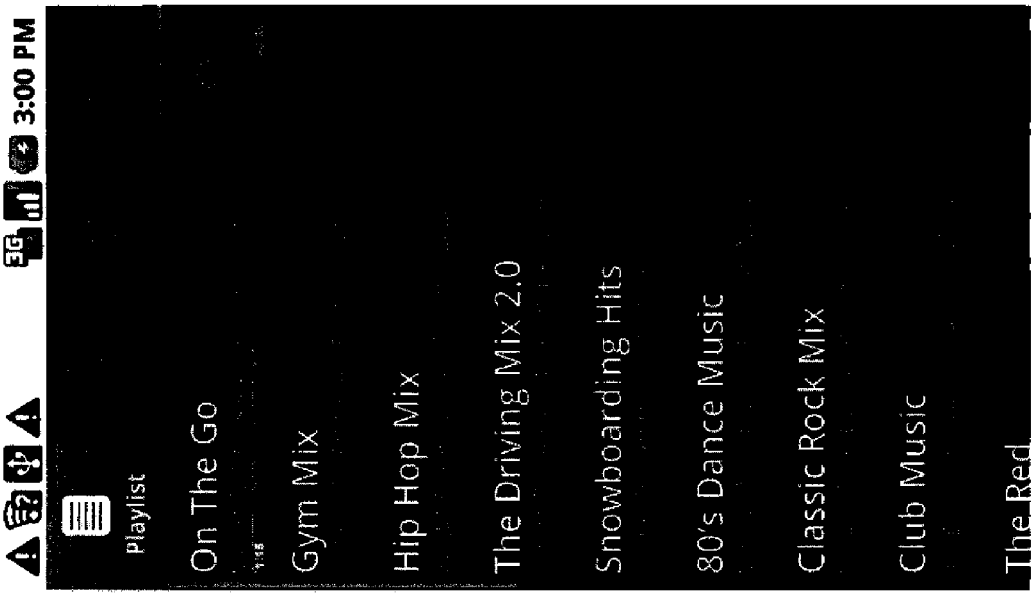

3:00 PM
Playlist
On The Go
Gym Mix
Hip Hop Mix
The Driving Mix 2.0
Snowboarding Hits
80's Dance Music
Classic Rock Mix
Club Music
The Red

FIGURE 18

FIGURE 19

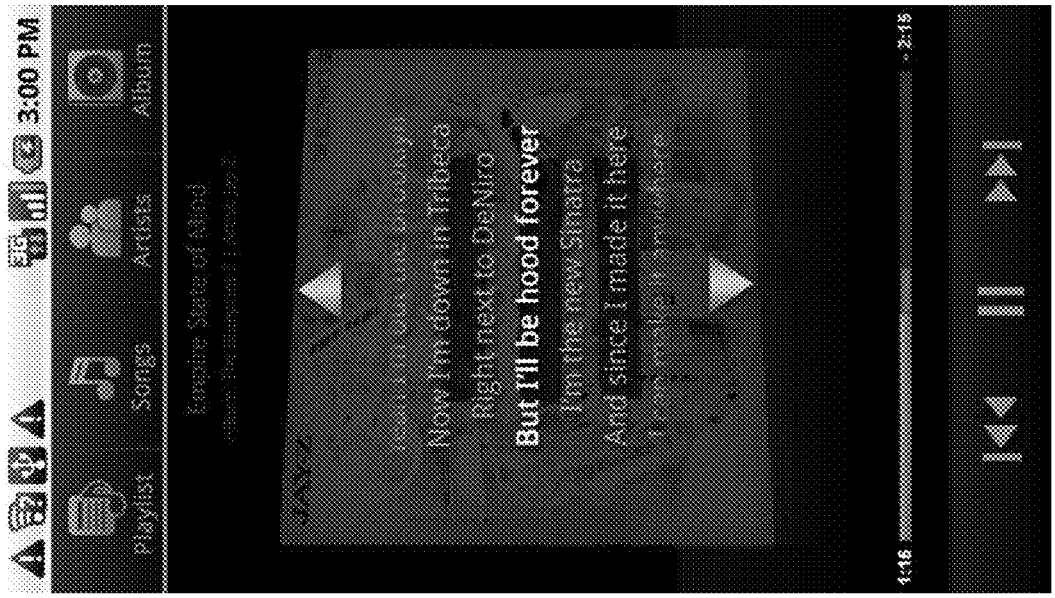

3:00 PM
Playlist
Songs
Artists
Album
Empire State of Mind
JAY-Z
Now I'm down in Tribeca
Right next to DeNiro
But I'll be hood forever
I'm the new Sinatra
And since I made it here
1:16
2:16

FIGURE 20

3:00 PM
Messaging
mSpot Music
Market
Phone
Contacts
Browser
Maps

FIGURE 21

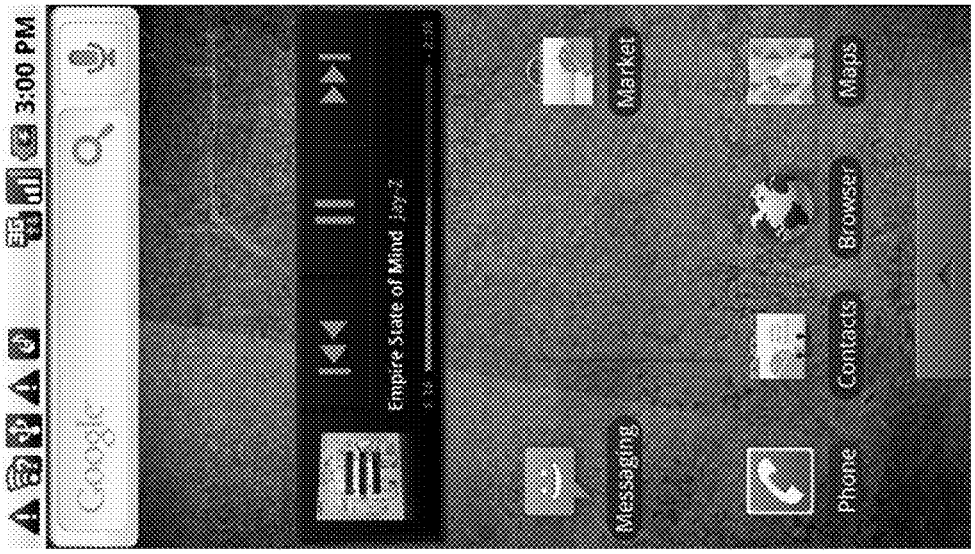


FIGURE 22

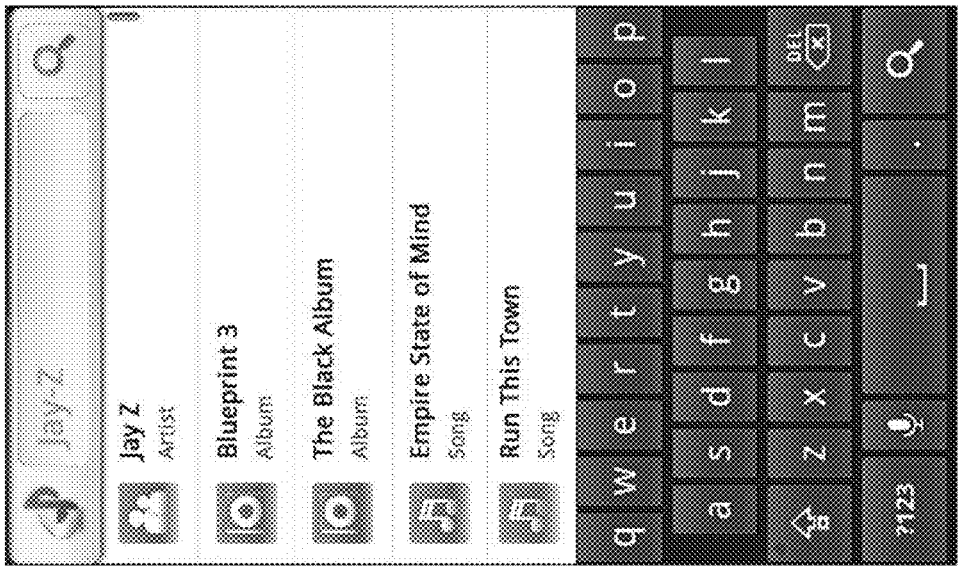


FIGURE 23

3:00 PM
12:30am
Wednesday Feb 03, 2010
JAY-Z
Empire State of Mind | Jay-Z
1:15
-2:15

FIGURE 24

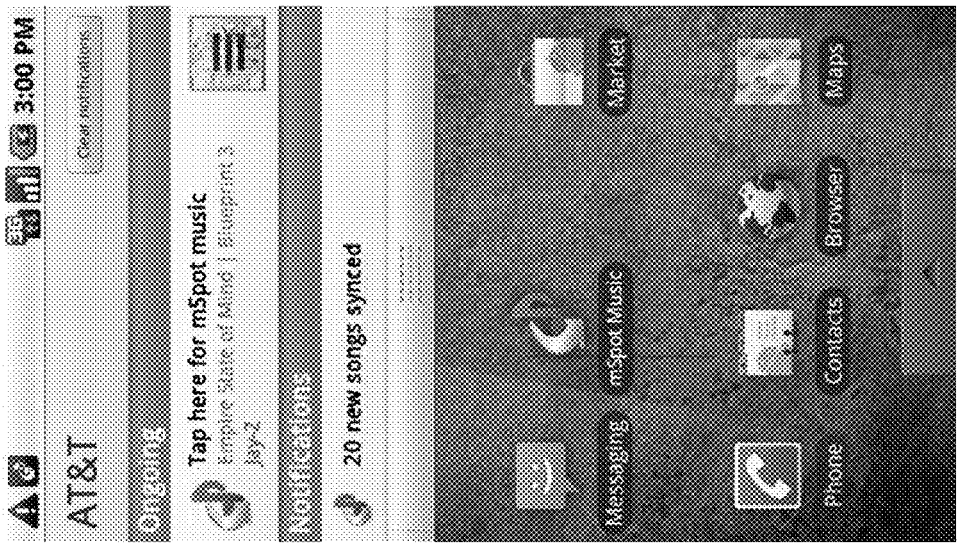


FIGURE 25

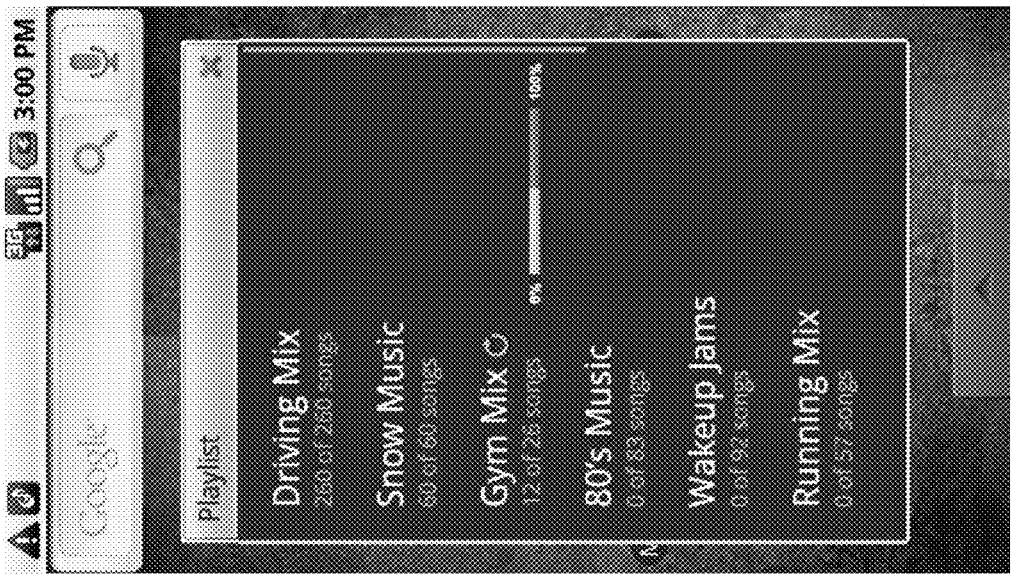


FIGURE 26

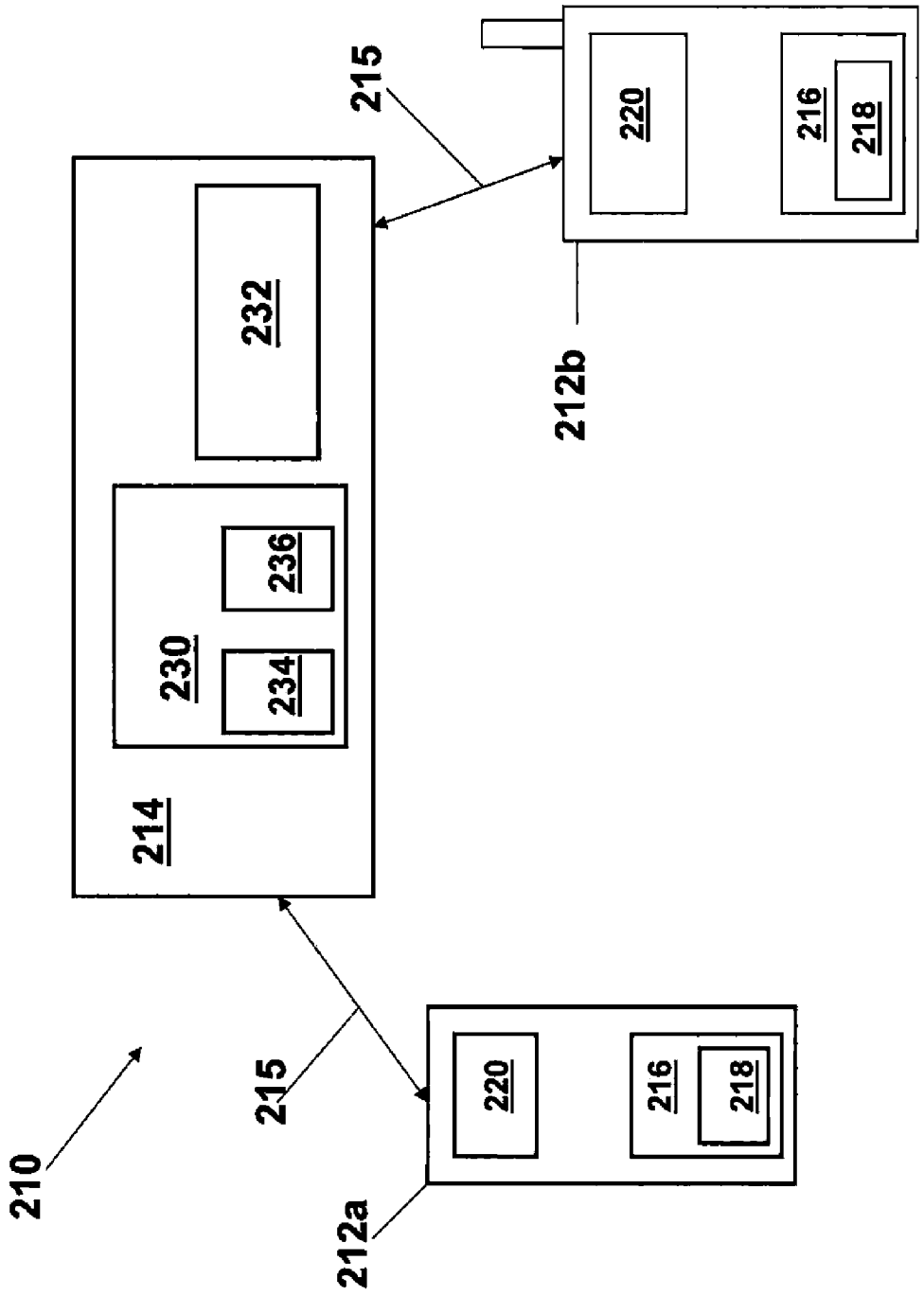

210
214
215
215
212a
212b
220
216
218
220
216
218
230
234
236
232

FIGURE 27

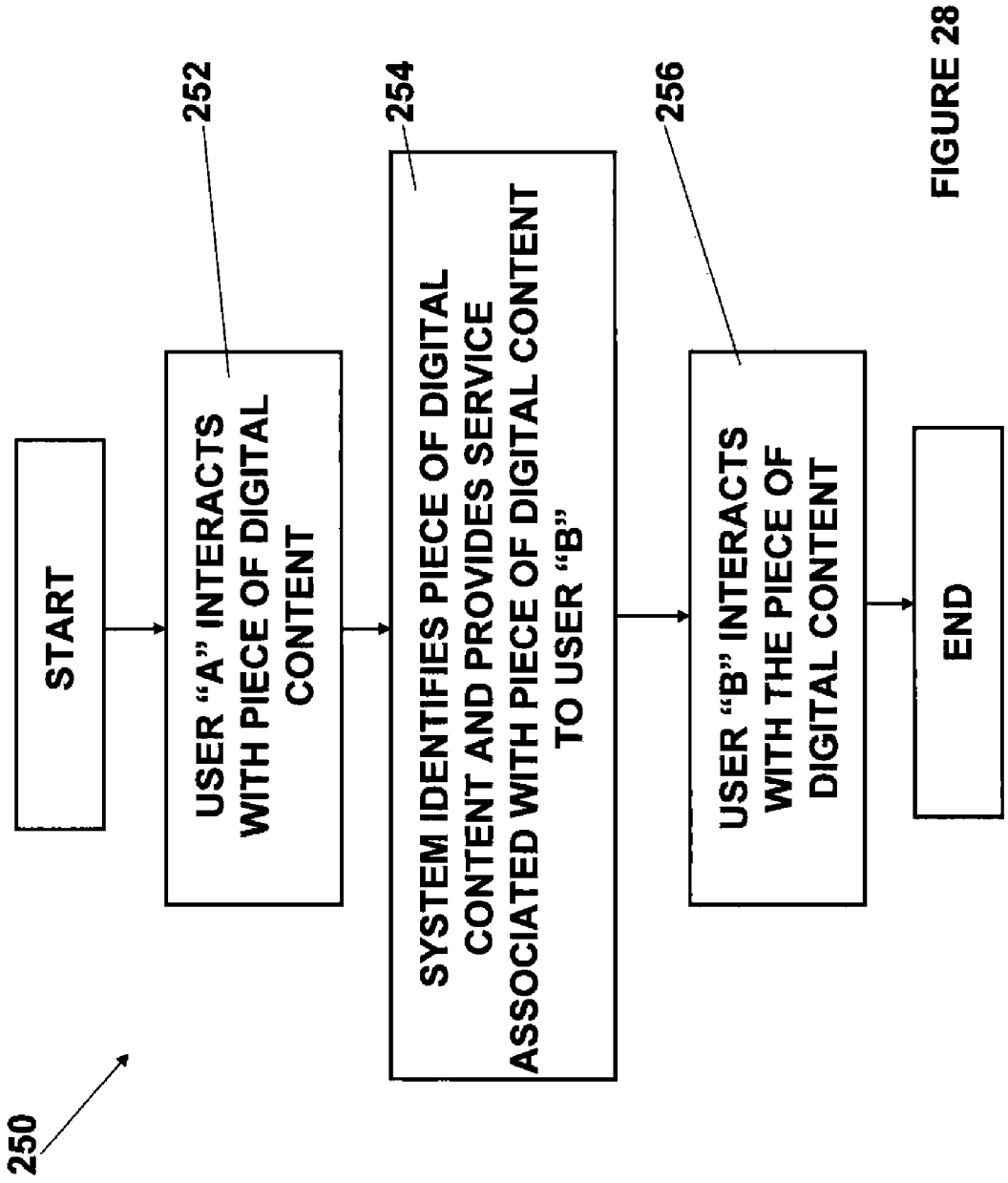

250
START
252
USER "A" INTERACTS WITH PIECE OF DIGITAL CONTENT
254
SYSTEM IDENTIFIES PIECE OF DIGITAL CONTENT AND PROVIDES SERVICE ASSOCIATED WITH PIECE OF DIGITAL CONTENT TO USER "B"
256
USER "B" INTERACTS WITH THE PIECE OF DIGITAL CONTENT
END

FIGURE 28

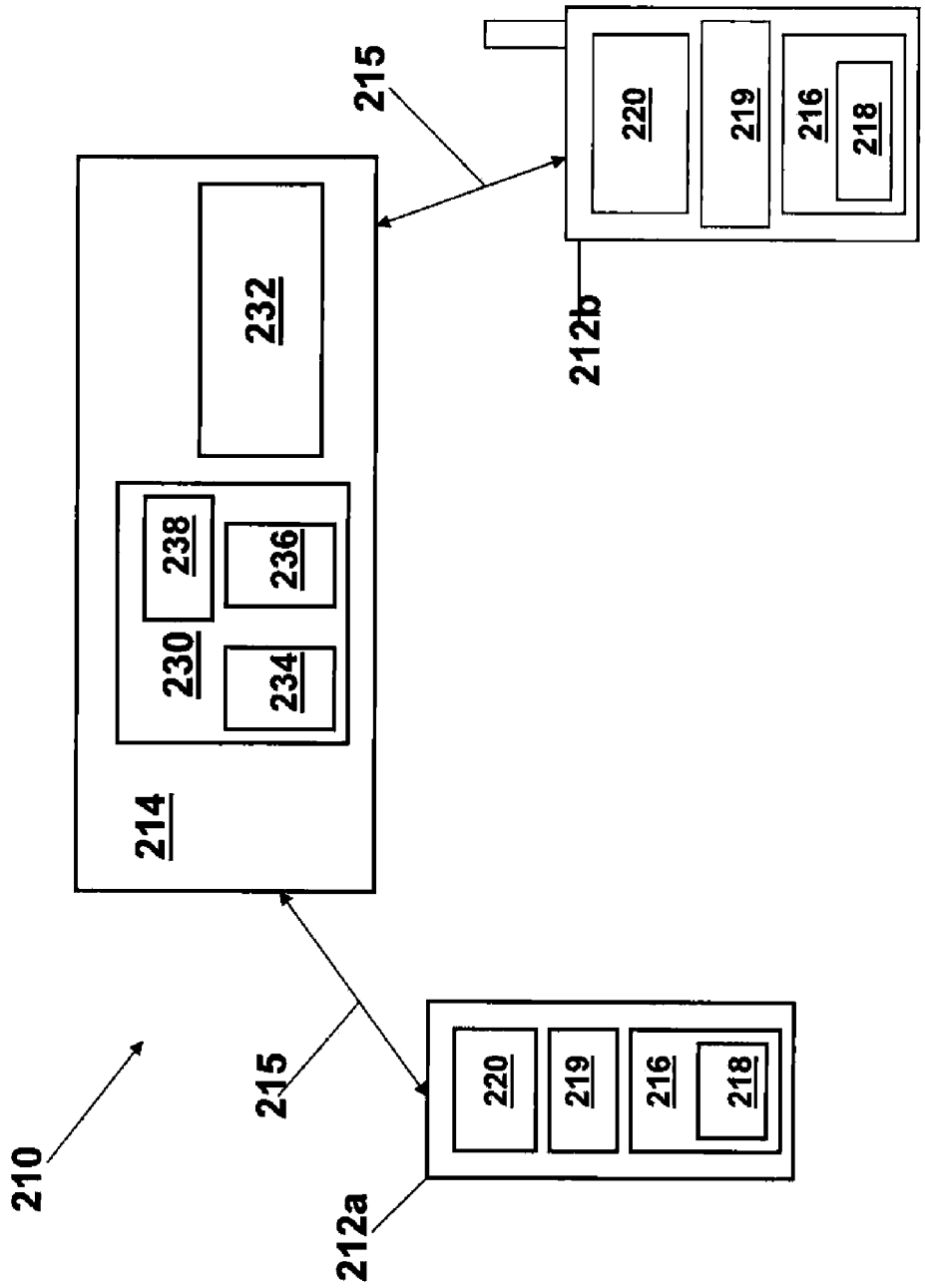


FIGURE 29

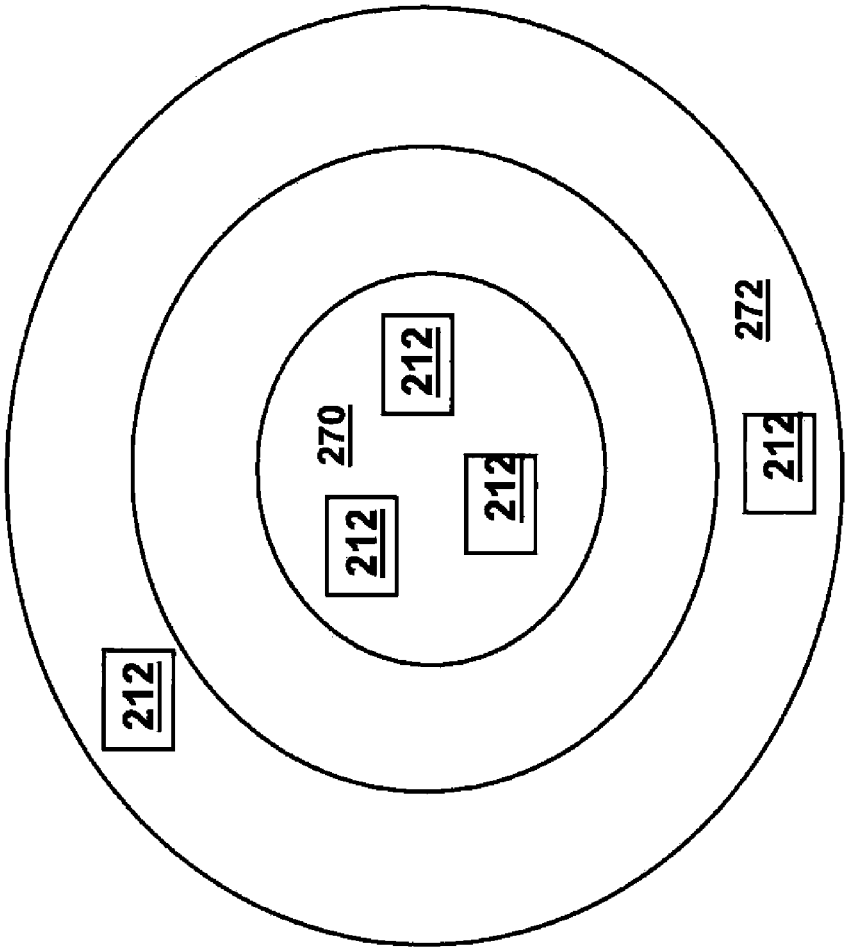


FIGURE 30

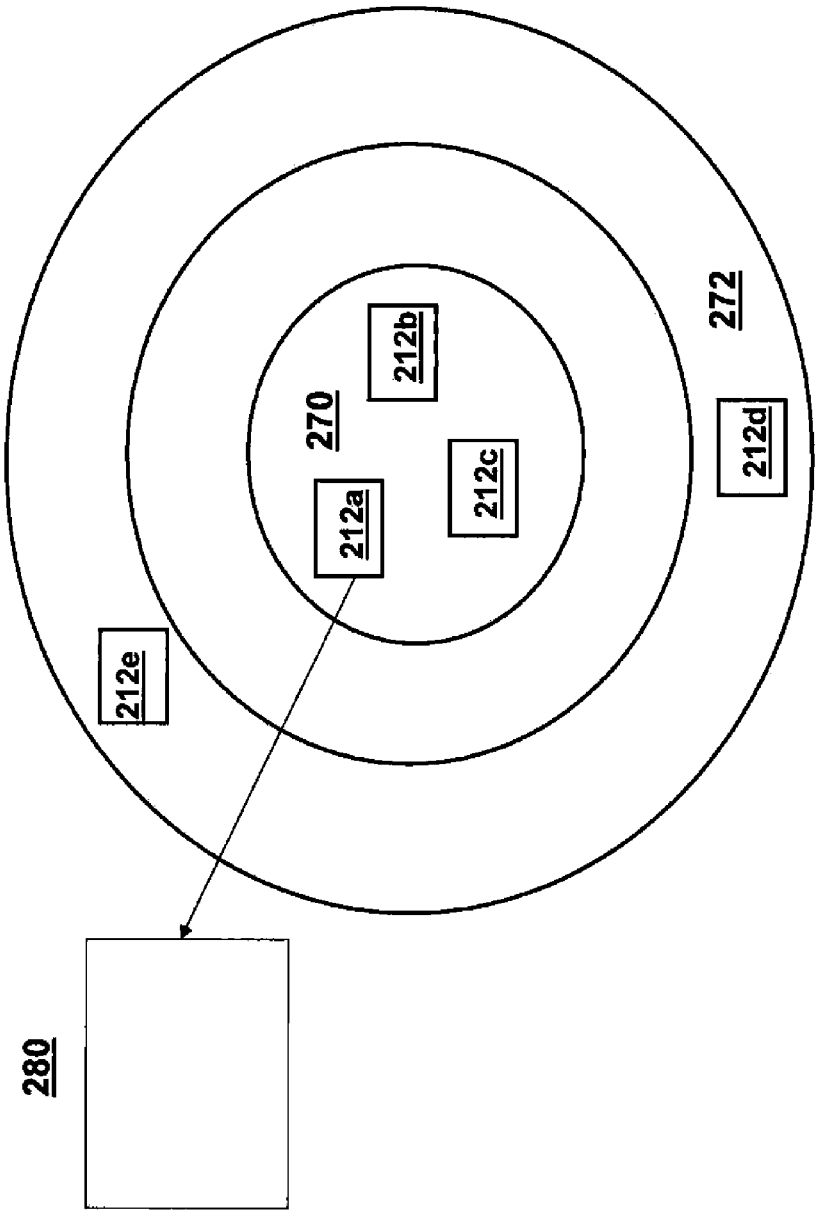


FIGURE 31

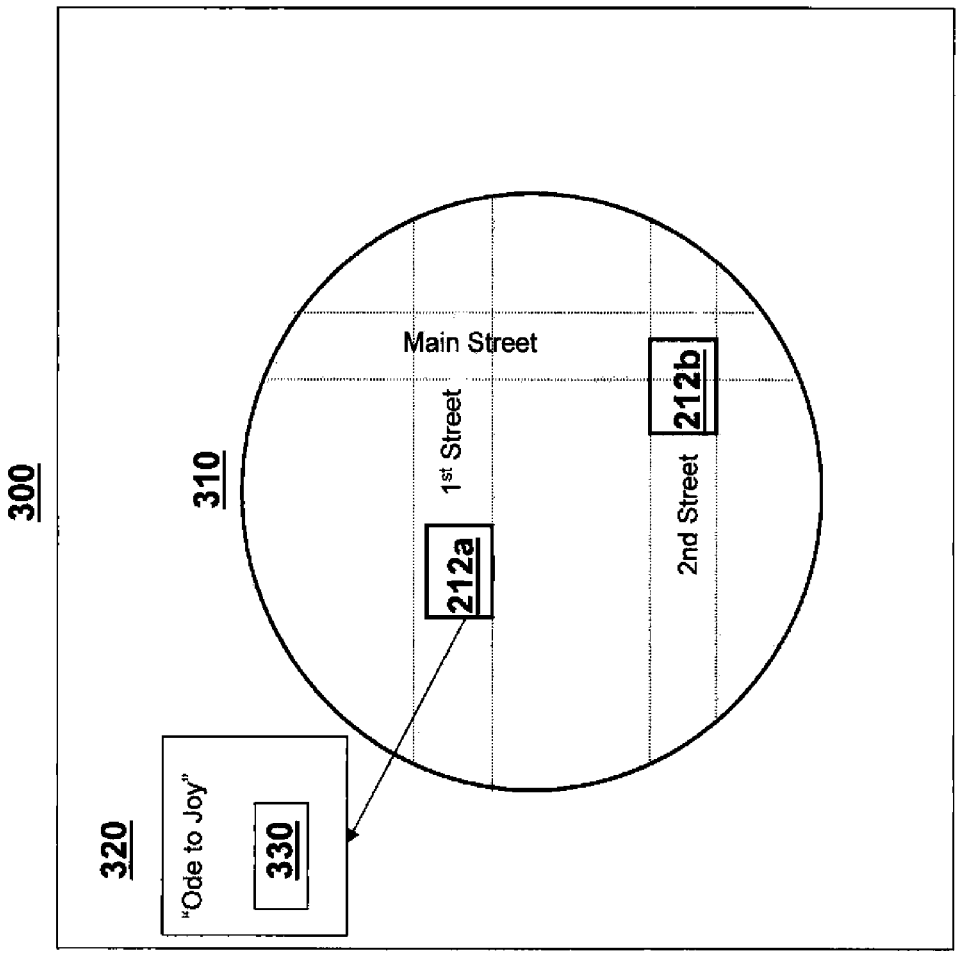

300
310
Main Street
1st Street
2nd Street
212a
212b
320
"Ode to Joy"
330

FIGURE 32

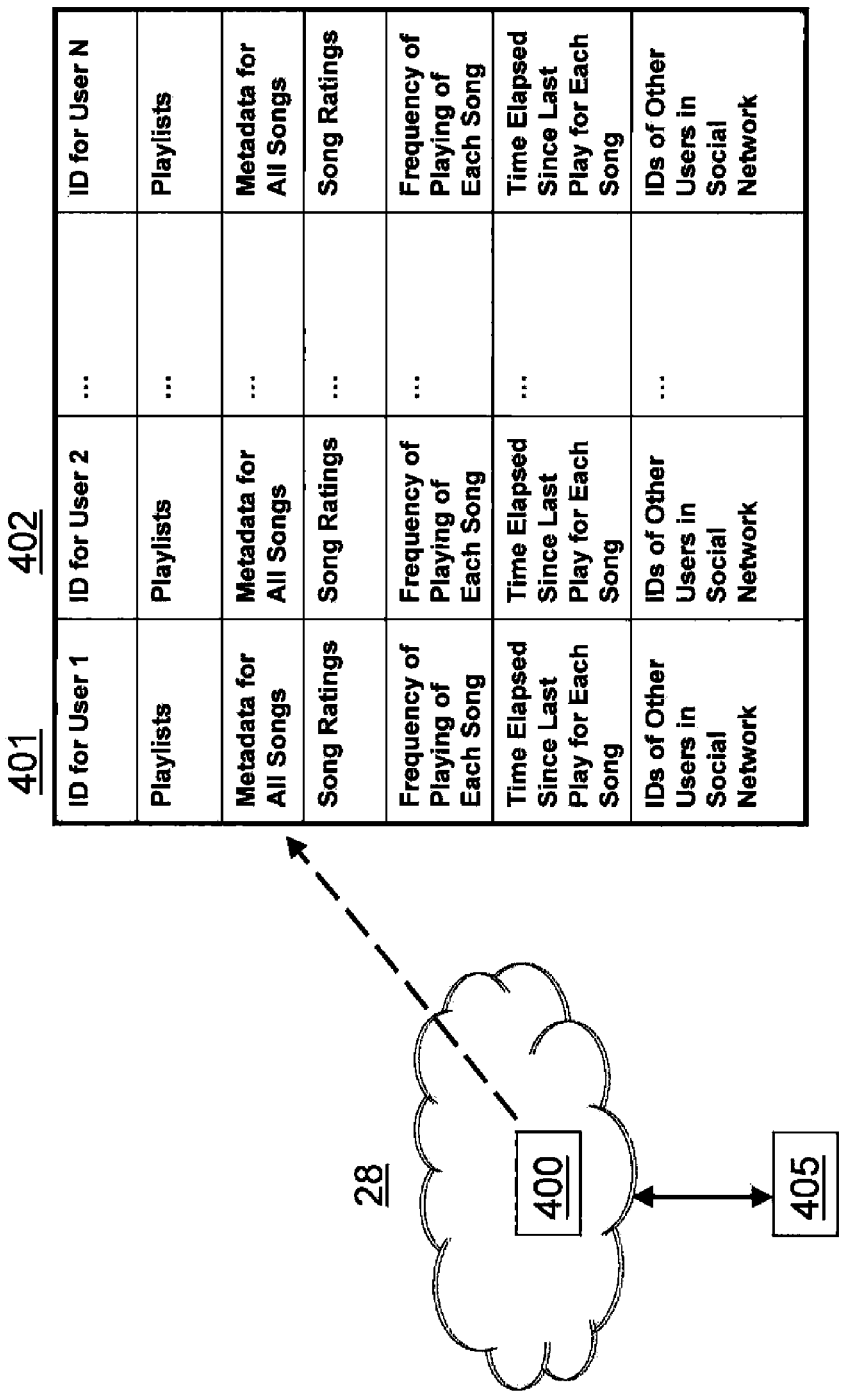

401
402
ID for User 1
ID for User 2
...
ID for User N
Playlists
Playlists
...
Playlists
Metadata for All Songs
Metadata for All Songs
...
Metadata for All Songs
Song Ratings
Song Ratings
...
Song Ratings
Frequency of Playing of Each Song
Frequency of Playing of Each Song
...
Frequency of Playing of Each Song
Time Elapsed Since Last Play for Each Song
Time Elapsed Since Last Play for Each Song
...
Time Elapsed Since Last Play for Each Song
IDs of Other Users in Social Network
IDs of Other Users in Social Network
...
IDs of Other Users in Social Network
28
400
405

FIGURE 33

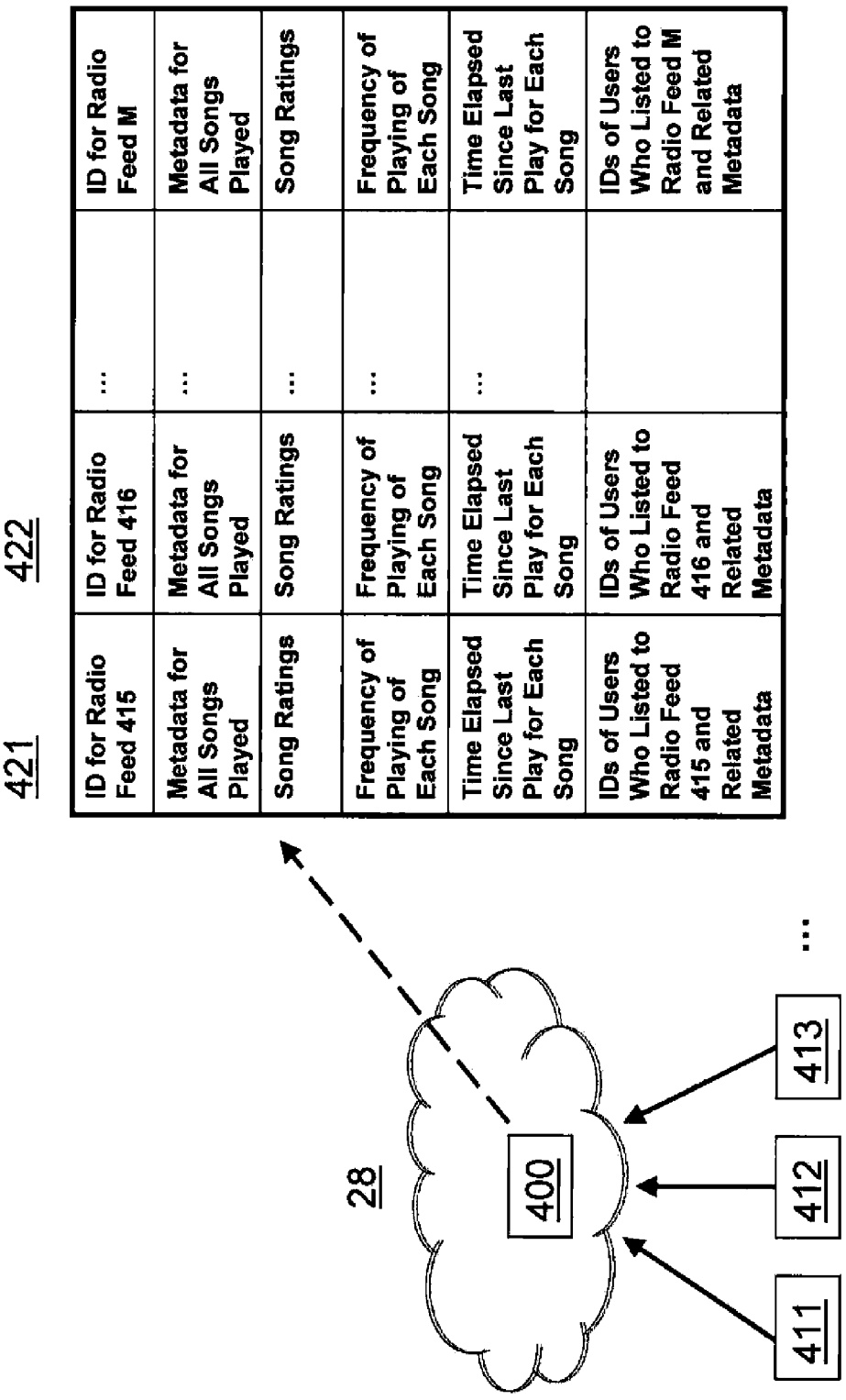

421
422
ID for Radio Feed 415
Metadata for All Songs Played
Song Ratings
Frequency of Playing of Each Song
Time Elapsed Since Last Play for Each Song
IDs of Users Who Listed to Radio Feed 415 and Related Metadata
ID for Radio Feed 416
Metadata for All Songs Played
Song Ratings
Frequency of Playing of Each Song
Time Elapsed Since Last Play for Each Song
IDs of Users Who Listed to Radio Feed 416 and Related Metadata
...
ID for Radio Feed M
Metadata for All Songs Played
Song Ratings
Frequency of Playing of Each Song
Time Elapsed Since Last Play for Each Song
IDs of Users Who Listed to Radio Feed M and Related Metadata
28
400
411
412
413
...

FIGURE 34

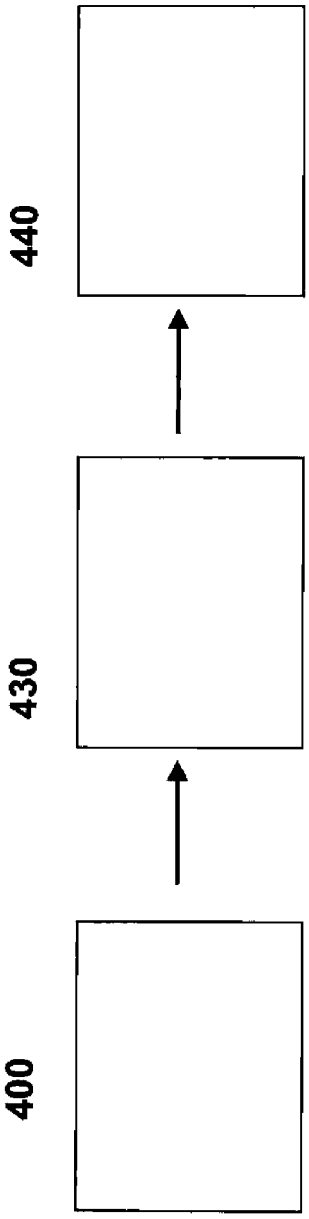


FIGURE 35A

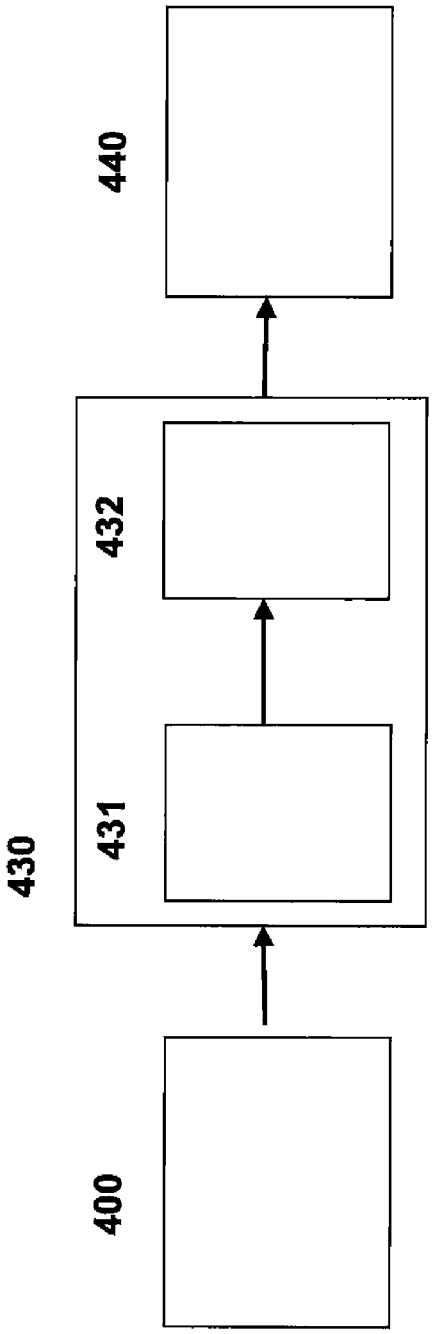


FIGURE 35B

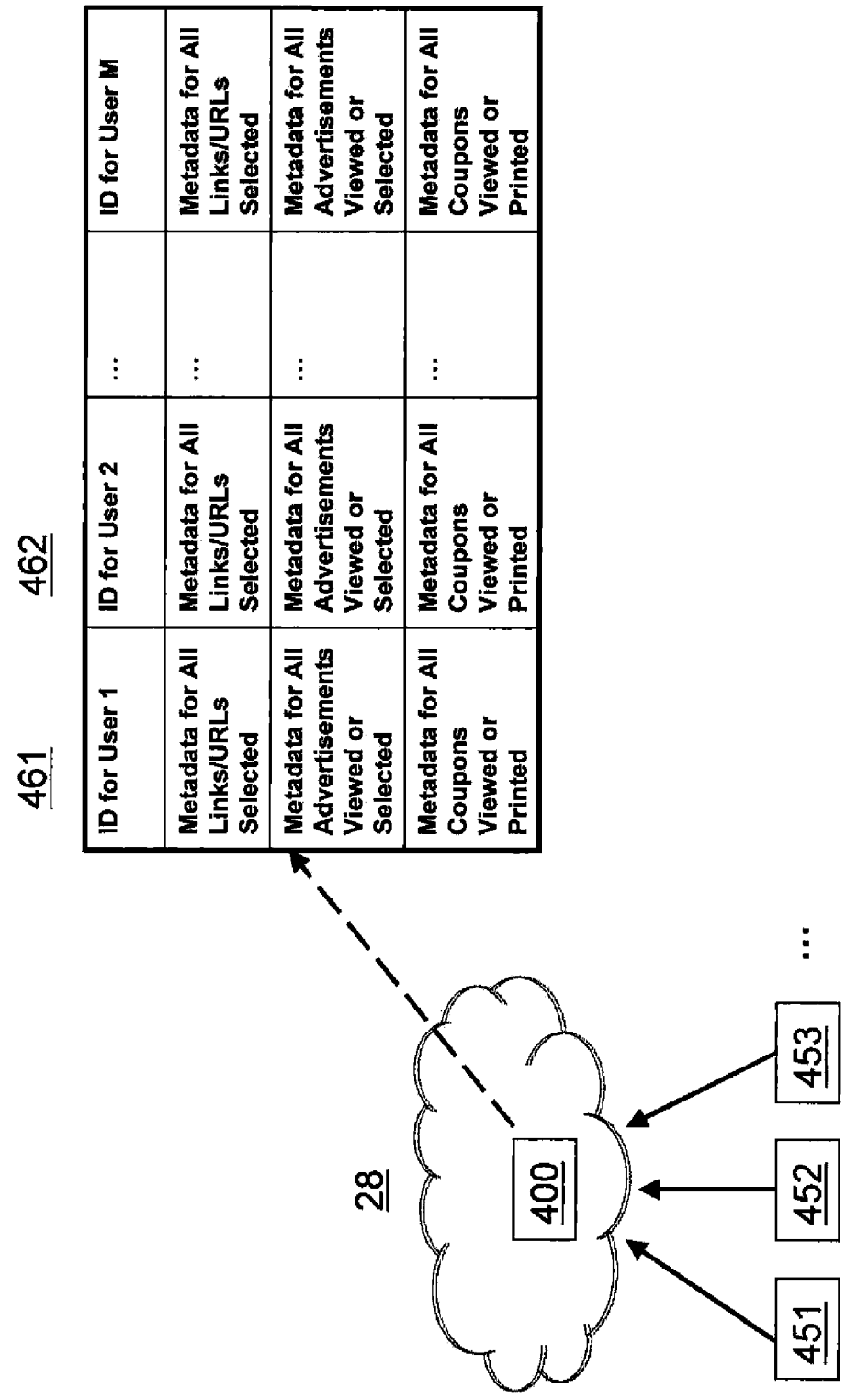

461
462
ID for User 1
ID for User 2
...
ID for User M
Metadata for All Links/URLs Selected
Metadata for All Links/URLs Selected
...
Metadata for All Links/URLs Selected
Metadata for All Advertisements Viewed or Selected
Metadata for All Advertisements Viewed or Selected
...
Metadata for All Advertisements Viewed or Selected
Metadata for All Coupons Viewed or Printed
Metadata for All Coupons Viewed or Printed
...
Metadata for All Coupons Viewed or Printed
28
400
451
452
453
...

FIGURE 36

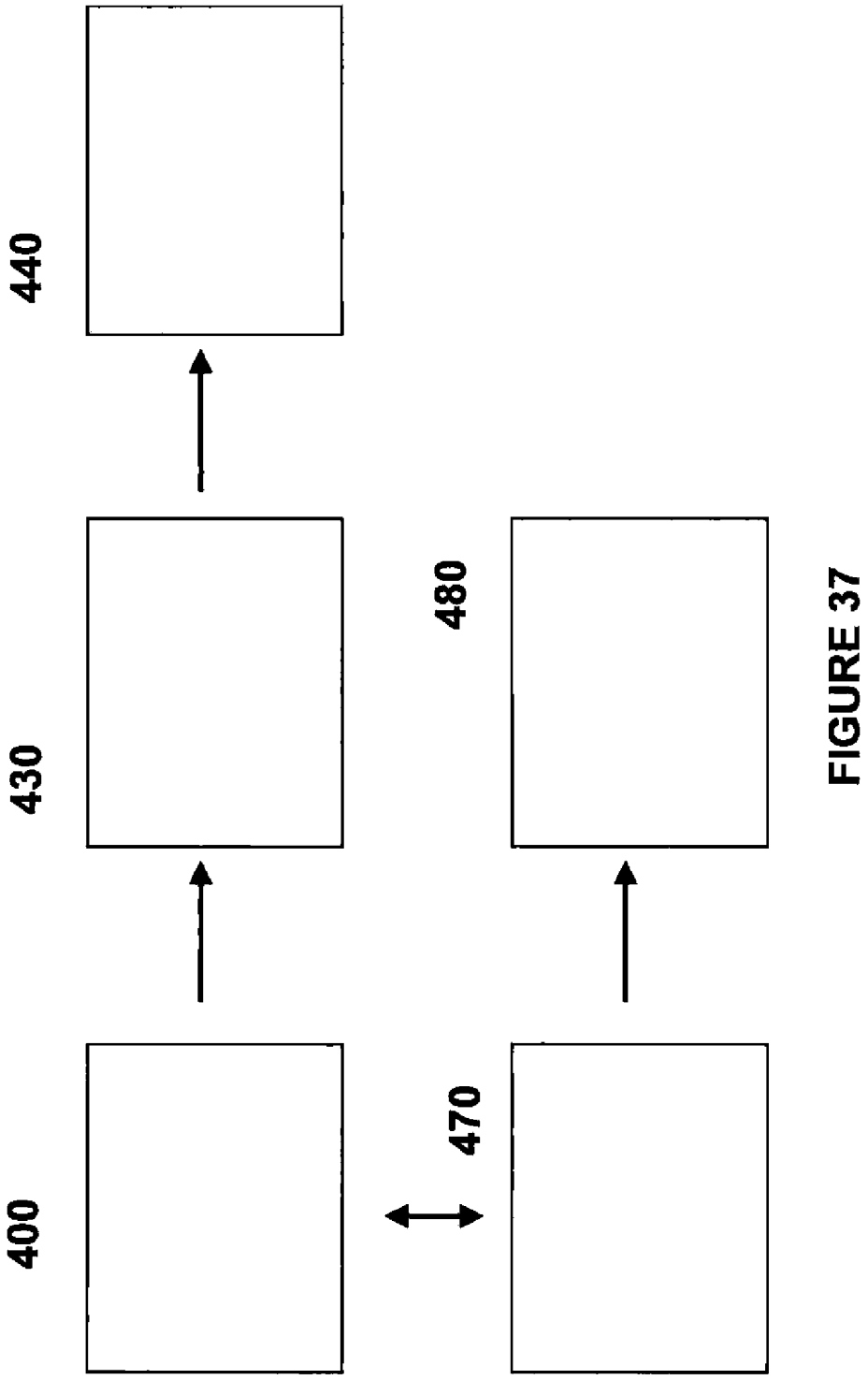


FIGURE 37

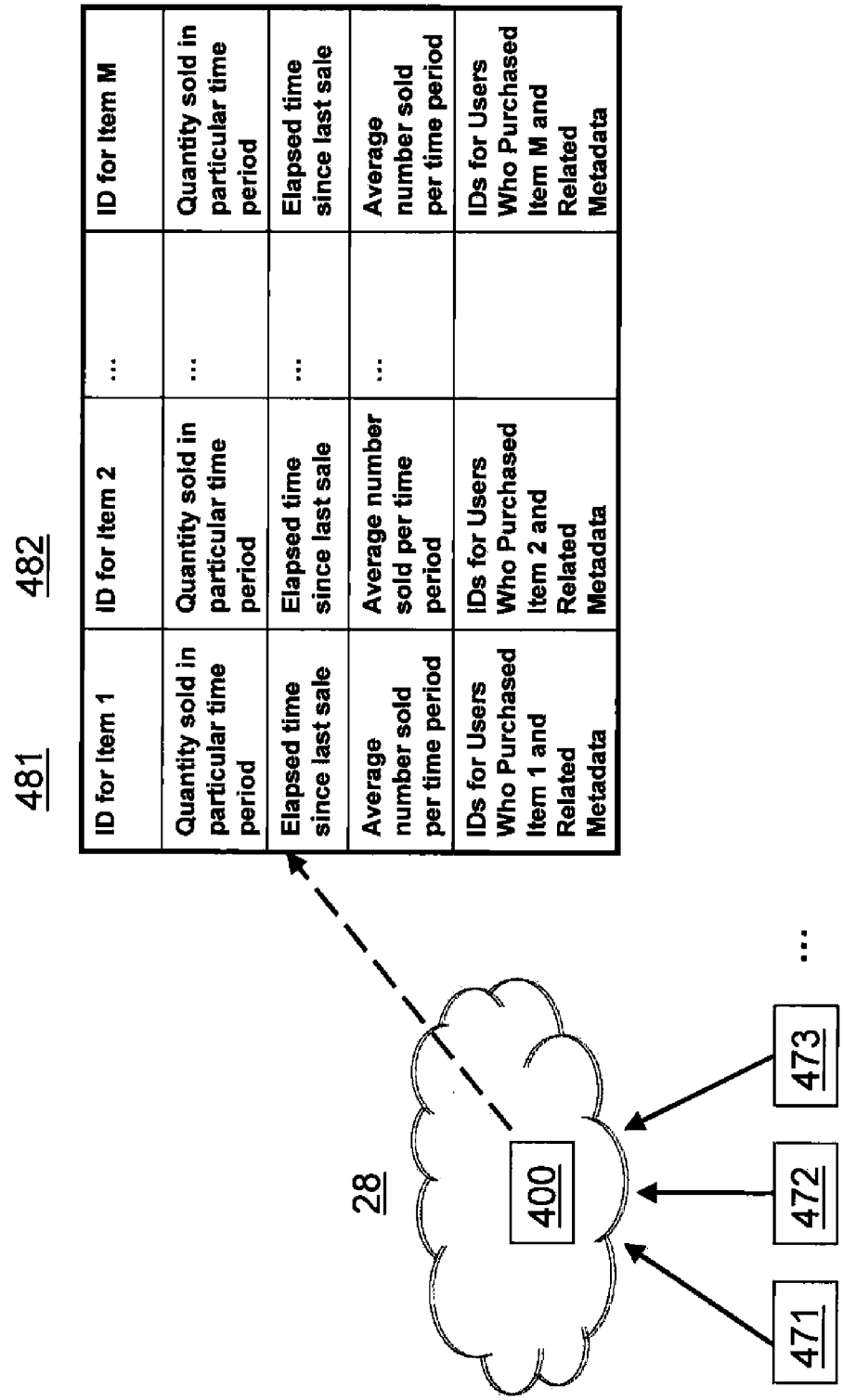

481
482
ID for Item 1
ID for Item 2
...
ID for Item M
Quantity sold in particular time period
Quantity sold in particular time period
...
Quantity sold in particular time period
Elapsed time since last sale
Elapsed time since last sale
...
Elapsed time since last sale
Average number sold per time period
Average number sold per time period
...
Average number sold per time period
IDs for Users Who Purchased Item 1 and Related Metadata
IDs for Users Who Purchased Item 2 and Related Metadata
IDs for Users Who Purchased Item M and Related Metadata
28
400
471
472
473
...

FIGURE 38

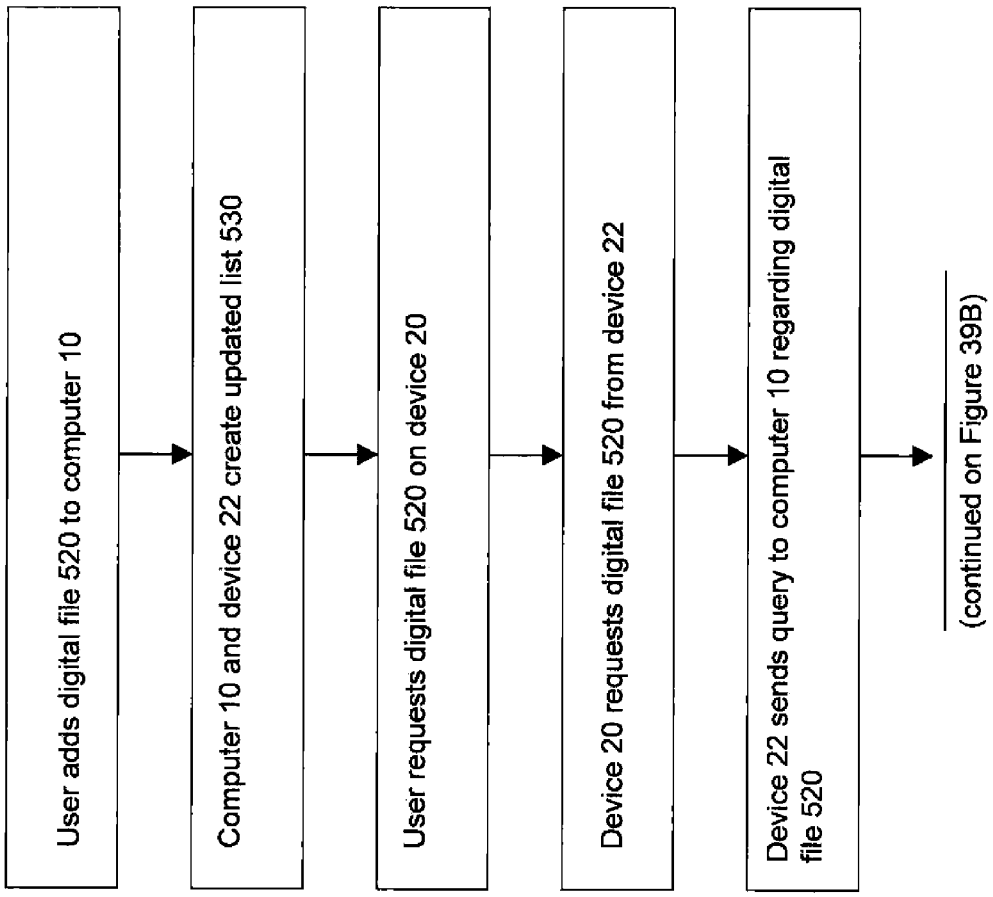

User adds digital file 520 to computer 10
Computer 10 and device 22 create updated list 530
User requests digital file 520 on device 20
Device 20 requests digital file 520 from device 22
Device 22 sends query to computer 10 regarding digital file 520
(continued on Figure 39B)
500
502
504
506
508

Figure 39A

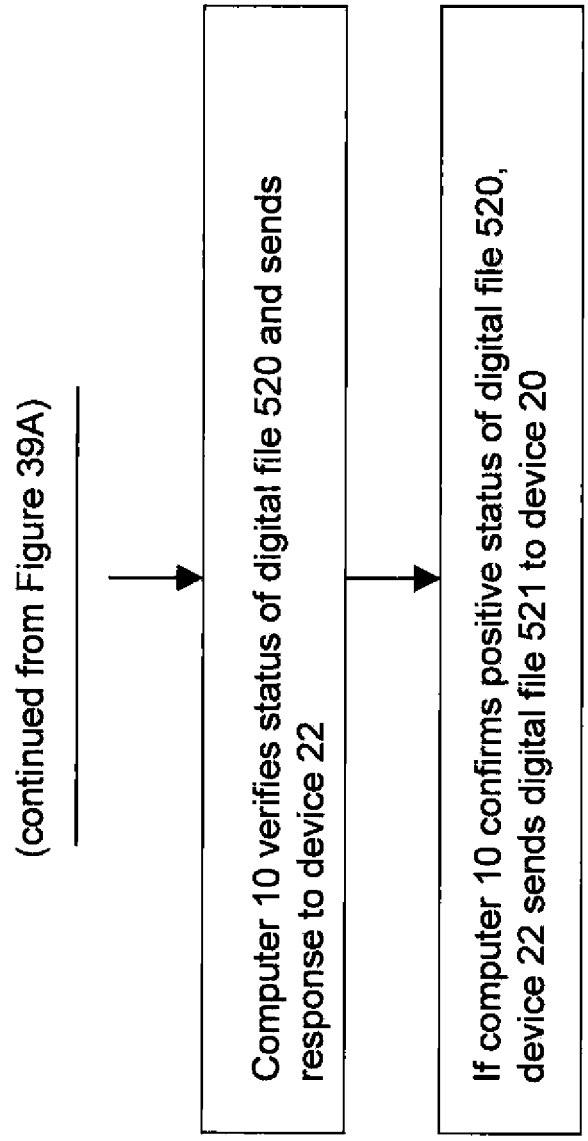

(continued from Figure 39A)
Computer 10 verifies status of digital file 520 and sends response to device 22
If computer 10 confirms positive status of digital file 520, device 22 sends digital file 521 to device 20
510
512

Figure 39B

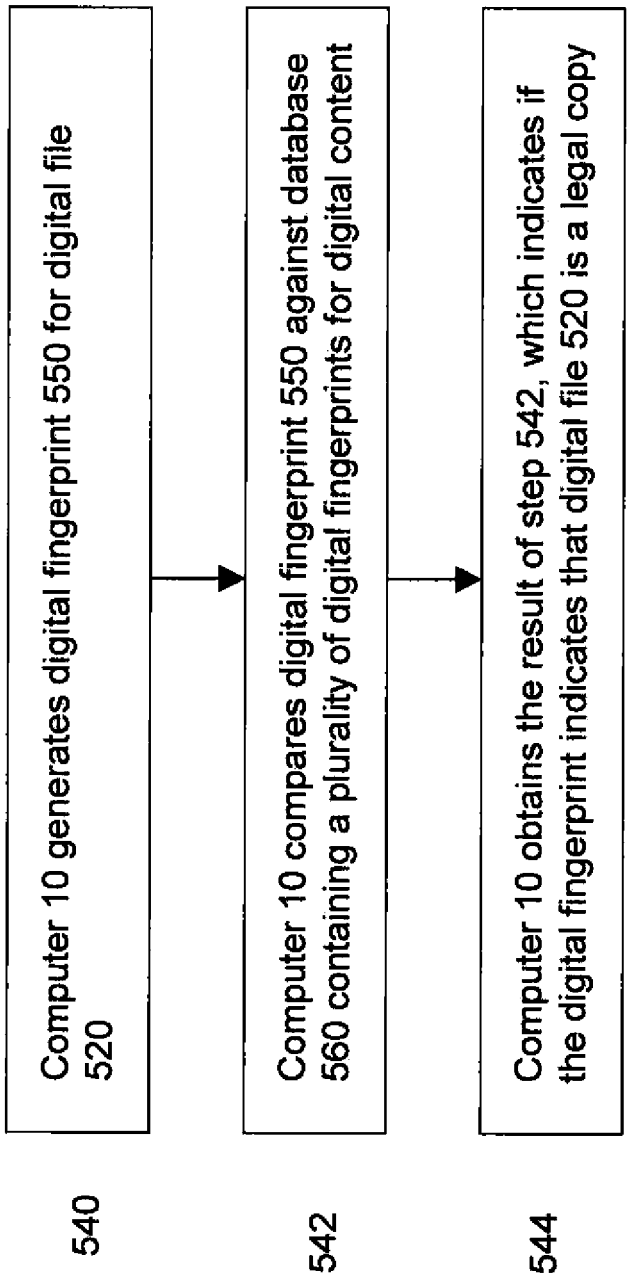

Computer 10 generates digital fingerprint 550 for digital file 520
Computer 10 compares digital fingerprint 550 against database 560 containing a plurality of digital fingerprints for digital content
Computer 10 obtains the result of step 542, which indicates if the digital fingerprint indicates that digital file 520 is a legal copy
540
542
544

Figure 40

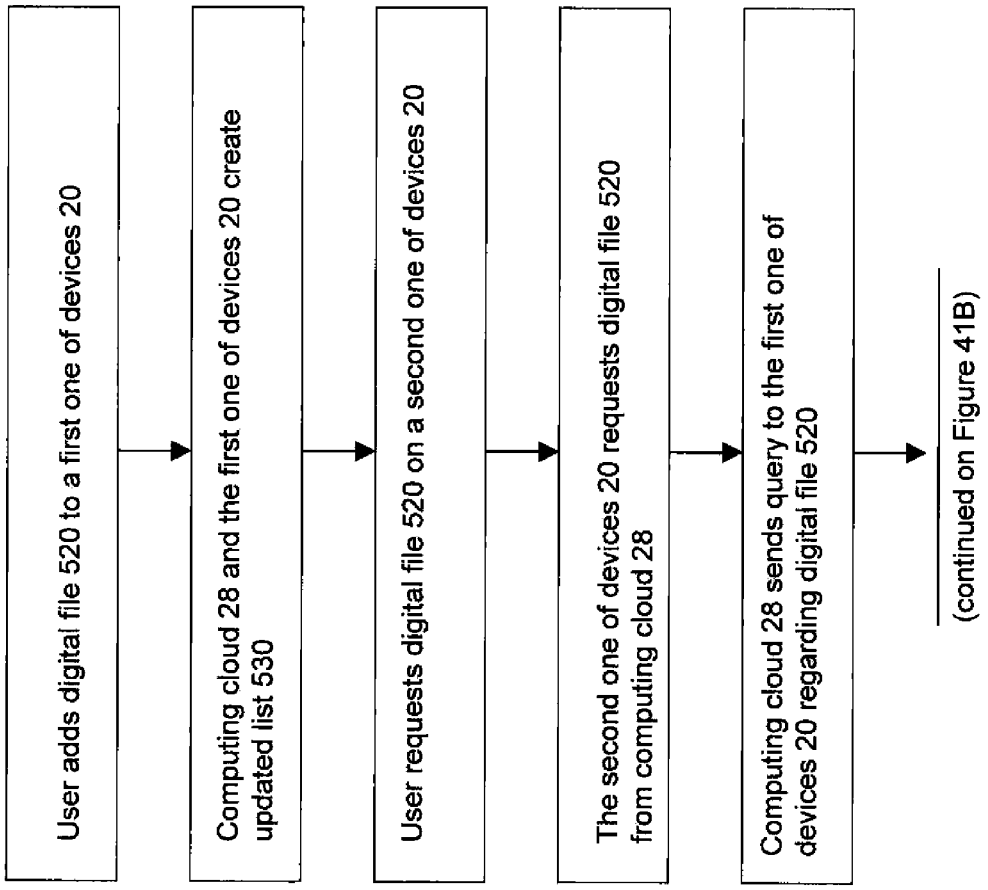

User adds digital file 520 to a first one of devices 20
600
Computing cloud 28 and the first one of devices 20 create updated list 530
602
User requests digital file 520 on a second one of devices 20
604
The second one of devices 20 requests digital file 520 from computing cloud 28
606
Computing cloud 28 sends query to the first one of devices 20 regarding digital file 520
608
(continued on Figure 41B)

Figure 41A

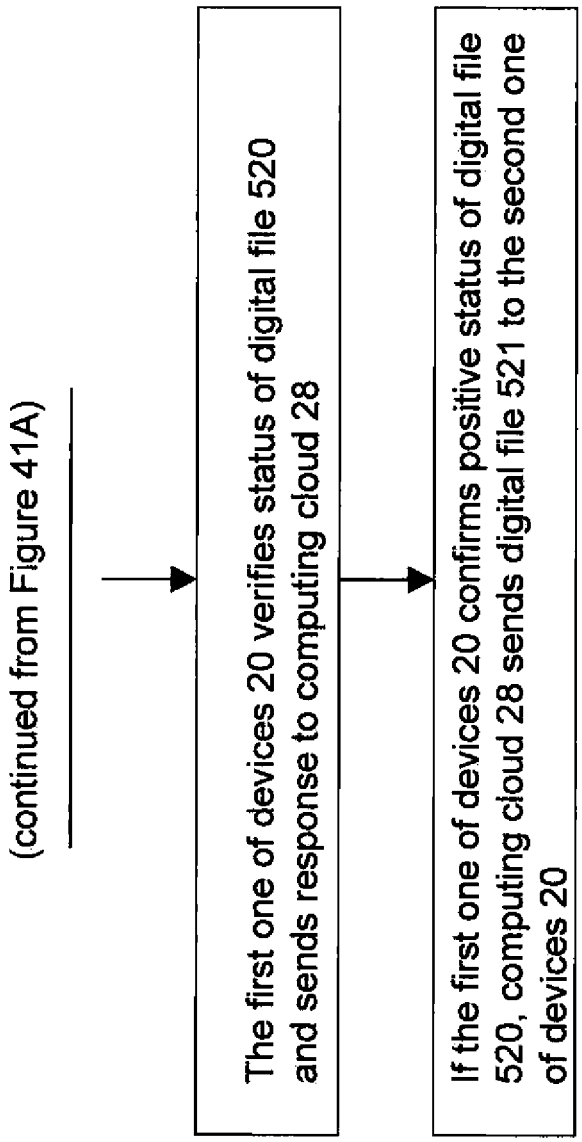

(continued from Figure 41A)
The first one of devices 20 verifies status of digital file 520 and sends response to computing cloud 28
610
If the first one of devices 20 confirms positive status of digital file 520, computing cloud 28 sends digital file 521 to the second one of devices 20
612

Figure 41B

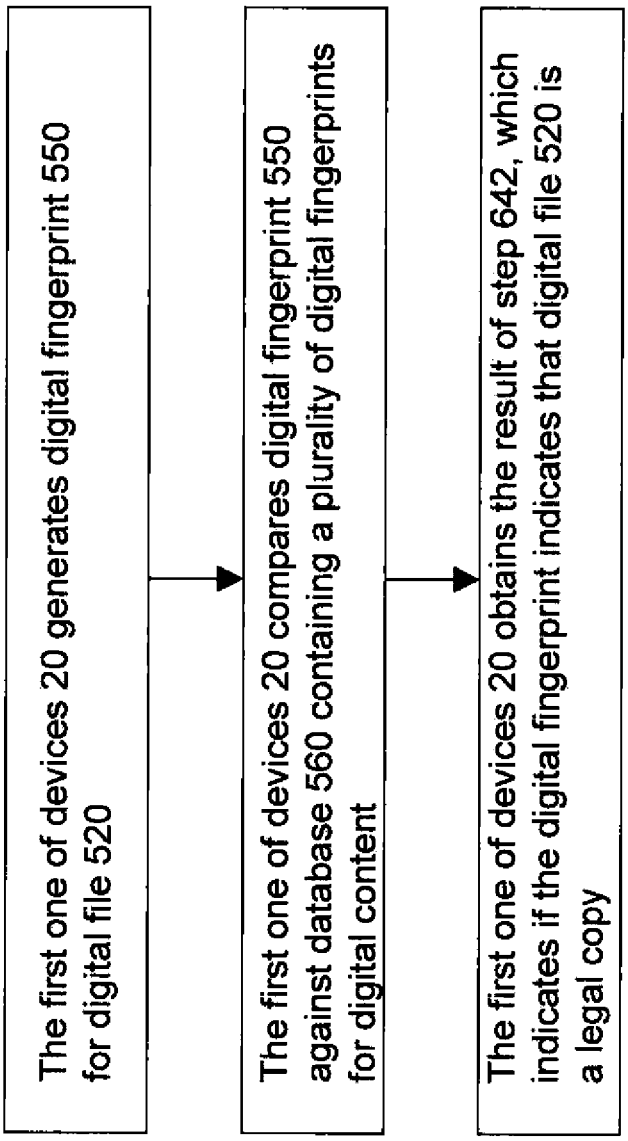

The first one of devices 20 generates digital fingerprint 550 for digital file 520
640
The first one of devices 20 compares digital fingerprint 550 against database 560 containing a plurality of digital fingerprints for digital content
642
The first one of devices 20 obtains the result of step 642, which indicates if the digital fingerprint indicates that digital file 520 is a legal copy
644

Figure 42

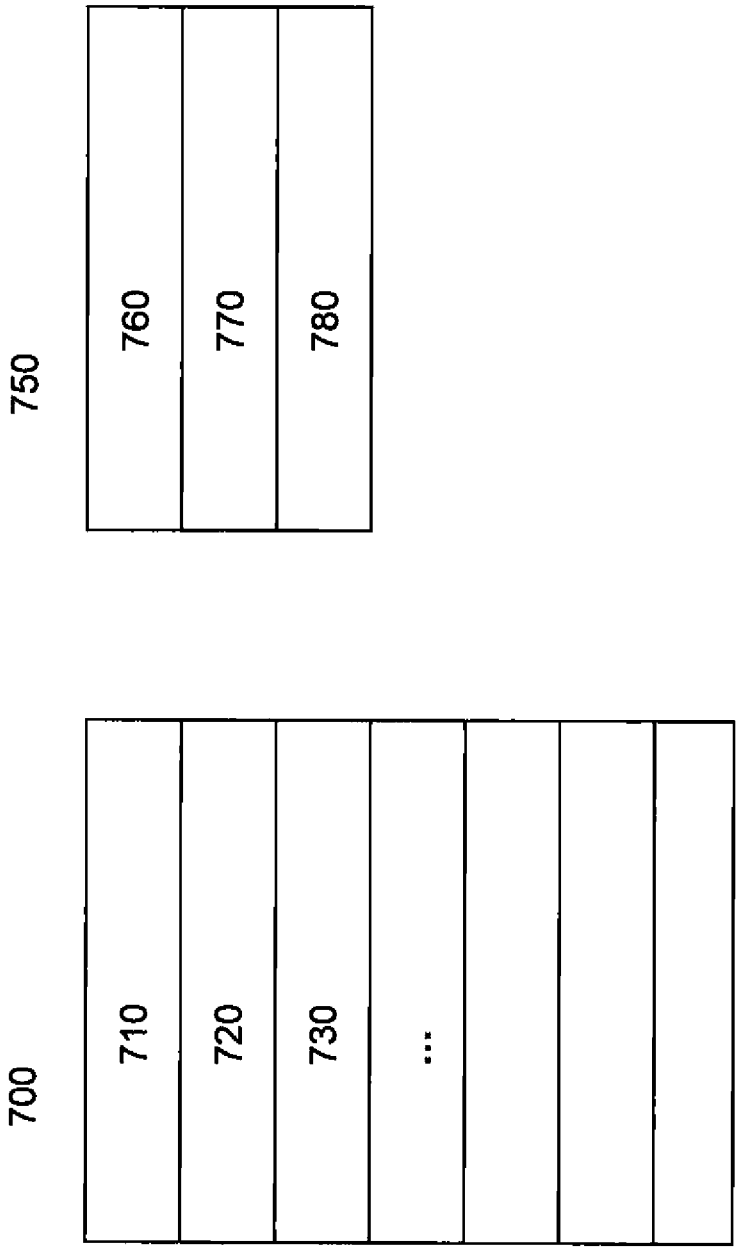


Figure 43

METHOD AND APPARATUS FOR PROVIDING RECOMMENDATIONS TO A USER OF A CLOUD COMPUTING SERVICE

PRIORITY CLAIM

This application claims the benefit under 35 USC 119(e) to U.S. Provisional Patent Application Ser. No. 61/563,320, filed on Nov. 23, 2011. This application also claims priority under 35 USC 120 and is a continuation-in-part of U.S. patent application Ser. No. 12/761,313, filed on Apr. 15, 2010 and titled "Method And Apparatus For Transferring Digital Content From A Personal Computer To A Mobile Handset," now U.S. Pat. No. 7,937,451, which is a continuation-in-part of U.S. patent application Ser. No. 12/355,546, now U.S. Pat. No. 7,865,572, filed on Jan. 16, 2009 and titled "Method And Apparatus For Transferring Digital Content From A Personal Computer To A Mobile Handset," which in turn claims the benefit under 35 USC 119(e) to U.S. Provisional Patent Application Ser. No. 61/040,131, filed on Mar. 27, 2008, which in turn is a continuation-in-part and claims priority under 35 USC 120 to U.S. patent application Ser. No. 11/788,711, now U.S. Pat. No. 7,865,571, filed on Apr. 20, 2007 and titled "Method And Apparatus For Transferring Digital Content From A Personal Computer To A Mobile Handset," which in turn claims priority under 35 USC 119(e) and 120 to U.S. Provisional Patent Application Ser. No. 60/879,416 filed on Jan. 8, 2007. U.S. Provisional Patent Application Ser. No. 61/563,320, filed on Nov. 23, 2011, of which this application claims the benefit, also claims priority under 35 USC 120 and is a continuation-in-part of U.S. patent application Ser. No. 12/414,548, filed on Mar. 30, 2009 and titled "Content Based Social Networking System and Method." All of these preceding applications and patents are incorporated by reference herein.

FIELD

The embodiments relate generally to a method and apparatus for generating recommendations for the user of a cloud computing service.

BACKGROUND

With the increase in storage capacity of hard disk drives and the prevalence of optical CD and DVD drives, users now can store their entire musical libraries on their personal computer (PC). For example, various software programs such as iTunes (offered by Apple Computer) allow a user to load musical content from CDs, store it on the computer's hard disk drive, organize the different content, and then play the music on the PC or burn all or part of the musical collection onto a CD or DVD. Users also can transfer the musical files to other devices, such as an iPod (offered by Apple Computer) or an MP3 player. These transfers typically require a direct, hardwired connection between the PC and the device, such as through a USB cable.

In recent years, mobile handsets (such as cellular phones and PDAs) have evolved beyond mere telephone and data collection devices. For example, many cellular phones now have sophisticated display screens and audio capabilities. Various companies (including mSpot, Inc., the assignee of this application), offer audio and video content that is "streamed" to the cellular phone using a wireless cellular network. This allows cellular phone users to listen to music or other audio content and watch movies or other video content on their cellular phones. However, the user's choices are limited to the content offered by the provider. What is needed in the art is a system that allows a user of a mobile handset to obtain digital content that he or she previously had stored on a personal computer or other device by downloading the content over a wireless network and to store it on the mobile handset.

In addition, today's systems offer fragmented digital content services that require a user to go to different web-sites, different devices or different services to be able to gain access to their digital content, such as Internet radio, music collections, news, local radio and full track music for example. Thus, it is desirable to provide a system that can store all of the different types of digital content in one location and allow the user to access the digital content and it is to this end that the disclosure is directed.

In addition, with the vast volume of digital content that is stored and potentially can be stored in a computing cloud, it is desirable to provide recommendations to users who access the computing cloud to assist them in finding digital content that is correlated with their personal preferences and patterns. It would also be desirable for the recommendations to be based at least in part on the preferences and patterns of members of a user's social network.

The prior art also includes digital content players, such as iPods or other computing devices, that allow a user to select a playlist or other grouping of digital content and to play an item in that playlist or other grouping, and then once the player has finished playing that item, to select another item from that playlist or grouping and begin playing that item without further user instruction. Using this prior art device, the player will always be playing digital content and the user can enjoy the content without constantly instructing the player what to play next. The prior art also includes a queuing feature, such as on the Rhapsody music service, whereby a user can create a queue of digital content and then the computing device plays items in the order contained in the queue. Once the computing device finishes playing all of the items in the queue, the computing device typically will have nothing left to play and will remain idle until further instructed by the user. This results in an undesirable downtime where nothing is being played. In addition, in the prior art, if the user is playing items in the queue and then selects an item that is not in the queue (for example, a song that is listed elsewhere), the computing device typically will stop playing items in the queue and will start playing the item selected by the user. Once that item is done playing, the computing device will have nothing to play and will go into downtime again. It would be desirable to create an improved system whereby the user can create a queue, while the queue is playing select an item that is not in the queue, and then have the system automatically play other items within the selection from which that item was chosen so there is no downtime.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of the prior art system involving a PC and an audio device such as an iPod or MP3 player and/or a portable storage device;

FIG. **2**A illustrates a first embodiment of a system that allows a device to download music from a computing device using a wireless network and the Internet;

FIG. **2**B illustrates a second embodiment of a system that allows a device to download music from a computing device using a wireless network and the Internet;

FIG. **3** is a flowchart showing a method for downloading music from a PC to a mobile handset;

FIG. **4** shows an example of a user interface on the mobile handset for downloading music from a PC to the mobile handset;

FIG. **5** illustrates another embodiment of the system that allows a mobile handset to share content with a computing device;

FIG. **6** illustrates another embodiment of the system that allows a mobile handset to share content among a plurality of computing devices;

FIG. **7**A illustrates a piece of content segmented into smaller pieces;

FIG. **7**B illustrates a method for downloading content to a mobile device that does not support progressive downloading;

FIG. **8** illustrates a network aware mobile handset application of the content sharing system;

FIG. **9** illustrates an example of a computer interface of the content system that allows synchronization of digital content and adding digital content;

FIG. **10** illustrates an example of a web interface of the content system that allows synchronization of digital content;

FIG. **11** illustrates an example of a user interface that allows the user to purchase a piece of digital content;

FIG. **12** illustrates an example of a user interface that allows the user to listen to a personal radio station using the content system;

FIG. **13** illustrates an example of a television interface of the content system;

FIG. **14** illustrates an example of the user interface for on-demand digital content of the content system;

FIG. **15** illustrates an example of a community user interface of the content system;

FIGS. **16**A and **16**B illustrate two examples of a user interface of the content system on a device;

FIG. **17** illustrate examples of a user interface of the content system on several different devices;

FIG. **18** illustrates an example of the user interface for songs/playlists available to a device;

FIG. **19** illustrates an example of the user interface for a digital content player on a particular device;

FIG. **20** illustrates an example of the lyric user interface for a digital content system on a particular device;

FIG. **21** illustrates an example of a live wallpaper function of a digital content system on a particular device;

FIG. **22** illustrates an example of a desktop widget of a digital content system on a particular device;

FIG. **23** illustrates an example of a quick search support function of a digital content system on a particular device;

FIG. **24** illustrates an example of a docked playback client of the digital content system on a particular device;

FIG. **25** illustrates an example of notification service integration of the digital content system on a particular device; and

FIG. **26** illustrates an example of live folders of the digital content system on a particular device.

FIG. **27** illustrates an implementation of an embodiment of a system for content social networking;

FIG. **28** illustrates an example of a method for content social networking;

FIG. **29** illustrates an implementation of an embodiment of the system for content social networking that incorporates geography; and

FIG. **30** illustrates a geographical embodiment for content social networking.

FIG. **31** illustrates a geographical embodiment for content social networking.

FIG. **32** illustrates an exemplary graphical user interface for a geographical embodiment for content social networking.

FIG. **33** illustrates an implementation of an embodiment for a content store and data structures therein.

FIG. **34** illustrates another implementation of an embodiment for a content store and data structures therein.

FIG. **35** illustrates an implementation of an embodiment for a recommendation engine.

FIG. **36** illustrates another implementation of an embodiment for a content store and data structures therein.

FIG. **37** illustrates an implementation of a recommendation engine and advertising engine.

FIG. **38** illustrates another implementation of an embodiment for a content store and data structures therein.

FIG. **39** illustrates another embodiment of a system and method that allows a device to download music from a computing device;

FIG. **40** illustrates an embodiment of a system and method that allows a device to confirm the ownership rights of a user to a particular piece of digital content;

FIG. **41** illustrates another embodiment of a system and method that allows a device to download music from a computing device;

FIG. **42** illustrates another embodiment of a system and method that allows a device to confirm the ownership rights of a user to a particular piece of digital content; and

FIG. **43** illustrates a system for playback of digital content according to another exemplary embodiment.

DETAILED DESCRIPTION OF ONE OR MORE EMBODIMENTS

FIG. **1** depicts the prior art system in which a user stores digital content (such as music, video, etc.) on computer **10**. Computer **10** can be a desktop, notebook, server, or any other type of device that can store digital data. User connects portable entertainment device **12** to computer **10** using interface **14**. Portable entertainment device **12** can be an iPod, MP3 player, or any other device that can store and play digital content. Interface **14** is a direct connection between computer **10** and portable entertainment device **12** and typically is a USB cable or Firewire cable.

In the alternative, a user can connect portable storage device **16** to computer **10** to download the digital data, and then disconnect portable storage device **16** from computer **10** and then connect portable storage device **16** to portable entertainment device **12** to download the data onto portable entertainment device **12**. Portable storage device **16** can be a Flash ROM chip, a hard disk drive, or other storage device.

FIG. **2**A depicts a first embodiment of a system that allows a mobile handset to download digital content from a computer using a wireless network. As in the prior art, a user stores digital content (such as photos, music, videos, Internet radio, news, local radio, podcasts, etc.) on a computing-based system **10**. However, in this embodiment, the user downloads the digital data from computer **10** to a device **20** in a wireless fashion over a wireless communication path. Device **20** may be a PDA, mobile phone, wireless email device (such as the Blackberry), or other handheld device that has wireless connectivity to be able to communicate with the computer **10** and download digital content from the computer **10**. Computer **10** communicates with a device **22**, such as a server computer, over network **24**. Network **24** can be any type of network, such as the Internet, and can be hardwired, wireless, or some combination of the two. Computer **10** runs a software application that allows a user to catalog and organize the digital

content of the user. The device **22** can be accessible over the Internet (such as through a URL address). The device **22** is shown in FIG. **2** as a single device. However, it is to be understood that the device **22** can instead comprise multiple devices, such as multiple servers.

Device **20** connects to device **22** over a wireless network **26**. Wireless network **26** can be a cellular telephone network, a WiFi network (such as an 802.11 network), a wireless data network (such as EV-DO, EDGE, 3G or LTE), WiMAX, a broadband network or any other wireless network. It is to be understood that wireless network **26** need not connect directly to server device **22**, but instead can connect through an indirect means such as by the Internet or through another network. The embodiment will be further described with reference to FIG. **3**.

FIG. **2**B illustrates a second embodiment of a system that allows a device **20** to download digital content from a computing device **28** using a wireless network and the Internet **24**, **26**. In this embodiment, the computing device **28** may be a computing cloud (with a plurality of processing unit based devices, storage devices, etc.) that allows a user to store their digital content in a digital content store for the user. Thus, in this embodiment, the computing device may include the computer **10** and the device **22** described above. As shown, the cloud may store the various digital content, such as photos, ringtones, Internet radio, full track stores, music collections, news and local radio, in a store associated with the user so that access to the digital content of the user is limited to the user and other authorized people and devices **20**. Thus, the user can connect to the cloud to interact with their digital content that is no longer siloed on a particular device or in a particular location. In this embodiment, each device **20** may be a processing unit based device with sufficient processing power, memory and connectivity, such as an MP3 player, smart phones, mobile phones personal computer, laptop, set-top box, television, in car digital content system or game consoles, to interact with the computing device **28** and play/display/interact with the digital content using the application described below. Each device may also have a digital content store that may be implemented in software and stored in the memory of the device. The system may also use various applications/access devices/application to access the digital content on the computing device **28** since the digital content can be accessed using typical browser applications, facebook or other applications or proprietary mobile device applications and browsers.

In this embodiment, each device **20** may include an plug-in/application/plurality of lines of code that is downloaded/stored on the device **20**, stored in the memory of the device and executed by the processor of the device wherein the plug-in/application/plurality of lines of code, among other things, implements a digital content user interface on each device as described below in more detail. Each plug-in/application/plurality of lines of code on each device may also automatically in the background (passive sync) or when a low cost network is available, transfer all of the digital content on the device up to the computing device **28** to provide for the intelligence upload of the digital content. The plug-in/application/plurality of lines of code on each device may also actively sync the digital content (an active process that syncs the digital content), batch sync the digital content (synchronize a group of pieces of digital content at a predetermined time, periodically or when a particular link is available) or a priority sync.

In the priority sync, the pieces of digital content for each user are prioritized and then synchronized between the device(s) and the content store based on the priorities. The priorities can be determined based on manual prioritization or automatic prioritization (based on storage size limits or scoring of the digital content) or a combination of manual and automatic prioritization. The automatic prioritization can be manually overridden by the user. Manual prioritization allows the user to designate certain pieces of digital content so that those pieces of digital content are synched first. In one implementation, all manual prioritized digital content is synched before other digital content. The storage size limits prioritization may prioritize the digital content for synching based on the overall size of the digital content in the collection of the user, the size of the digital content store in the cloud of the user and/or the storage size of a particular device **20**. The scoring of the digital content may use one or more different metrics, such as for example the number of times a piece of digital content has been played, whether a piece of digital content appears on a playlist, whether or not the piece of digital content was recently added/purchased by the user, the popularity of the piece of digital content, etc.) to rank each piece of digital content and sync the digital content based on the rankings. When the manual and automatic prioritization are used together, the content system may, for example, include all manually prioritized digital content, and then include as much of the automatically prioritized digital content for the storage size available (on the cloud/computer or on the device) unless the user has overridden the automatically prioritized digital content.

At all times, each plug-in/application/plurality of lines of code on each device **20** may have a list of the digital content of the user (which may be just the content on the device or all of the content of the user), but the actual digital content filed may be stored in the computing device **28**. The plug-in/application/plurality of lines of code on each device **20** may also include a digital content replacement process to ensure that each device has sufficient memory space to store the newest downloaded digital content. The replacement strategy may be a least recently used strategy (where the least recently used digital content is deleted), a least recently played strategy and the like. In addition, for certain devices **20** that allow multiple executive threads (such as devices using the Android operating system, for example), the plug-in/application/plurality of lines of code may incorporate a background process that synchronizes the digital content list to the device without user involvement. FIG. **26** illustrates an example of a user interface of this type of device that provides live folders and background synching.

In the embodiment shown in FIG. **2**B, the content store in the cloud **28** or computer **10** may store digital content for each household member/member of the group that owns the digital content. Then, each user or each device **20** may select some portion or all of the entire digital content store for the group to synchronize to the device **20** of the user. For example, in a family with a father, a daughter aged **12** and a son aged **16** who share the digital content store in the cloud **28**, the father, daughter and son may have different musical tastes, for example, and therefore each of the father, daughter and son may synchronize (using playlists, etc.) a subset of the entire digital content store to their personal device. The owner of a particular content store in the cloud **28** or computer **10** may also be allowed to authorize one or more additional devices **20** (up to N devices) to synchronize with the content store such as to allow a new device to use the digital content in the content store.

In addition to the downloading and exchanging of the digital content between the device **20** and the computer **10**, the second embodiment of the system also allows a user to directly transfer digital content between the various devices

20 using a wired or wireless connection. In one implementation, the computing device 28 may include a manager unit (that may be implemented in software on a server computer that is part of the overall computing device 28) that manages the device 20 to device direct transfer of digital content (authentication, protocols, etc.) and the devices 20 interact with the manager unit. In another implementation, the plug-in/application/plurality of lines of code each device may include lines of code to implement the direct transfer of digital content since each device is aware of its neighbors of certain networks, such as LANs, and can thus initiate a transfer of the digital content. The device to device transfer may occur over a hardwire link, such as a USB cable or a LAN, a wireless link, such as Bluetooth, Wifi or 3G, or using a hardware device, such as an SD card. The system may select the fastest link available when transferring the digital content. The device to device transfer may be controlled/managed by a computer of the content system. For example, the computer of the content system may determine the identifier of each device that wants to participate in the direct transfer, authenticate that each device is authorized to synchronize with the content store and then allow the direct transfer if both device are authenticated. The computer or each device may determine the appropriate link over which to exchange the digital content.

The synching of digital content directly between devices as well as the synching between the computer/cloud 10, 28 can be managed in a number of ways. For example, the synching can always operate over the lowest cost network available to reduce the data costs. For the device 20 that is plugged into a power source, synching can be done in the background since the synching will not drain the battery of the device whereas a device operating on battery power may deactivate background synching or slow down the synching even if a fast network is available to prevent battery drain. On a computer 10, the content system may throttle the synching based on the other usage of the computer by the user. For example, when the screen saver is active (meaning no use by the user), the synching may go as fast as possible whereas when the computer is being used by the user for other activities, the synching process may be reduced so that the synching does not interfere with the overall operation of the computer.

FIG. 3 is a flowchart depicting the interaction of the various elements shown in FIG. 2. Computer 10 connects to device 22 over network 24. Computer 10 then registers with device 22 (30) so that device 22 associates the digital content in the computer 10 with a particular user and a particular mobile handset. Computer 10 then listens on an open http connection to device 22 (32) and waits for communications from server device 22. Mobile handset 20 contacts server device 22 (34) over wireless network 26. Once the computer 10 is registered with the device 22, the user of the mobile handset, when the handset is turned on, sees the digital content actually stored on the mobile handset as well as the digital content stored in the computer 10 in a single display as shown in more detail in FIG. 4. When the user of the mobile handset wants to use a piece of digital content stored on the computer 10, the mobile handset 20 issues a command to computer 10 (36), such as a command to transfer a certain piece of digital content. Computer 10 responds to the command and transfers the digital content to device 22 (38). Mobile handset 20 then obtains digital content from device 22 (step 40). Thus, mobile handset 20 is able to obtain digital content (such as a music file) from computer 10 in a fashion that is at least partly wireless. Using the above system and method, a user may have digital content stored on his/her computer as well as on the mobile handset and may synchronize the digital content between the computer and the mobile handset in a wireless manner. For example, the system permits a user to have a much larger digital content catalog available for use than can be stored in the mobile handset. In addition, the system permits the user to download particular digital content at any time, such as downloading a particular movie before a long airplane flight. The user also can download additional data associated with the digital content, such as metadata (artist information, duration, title, etc.), cover art, and other data.

FIG. 4 shows an embodiment of a user interface for mobile handset 20 once the computer 10 is registered with the device 22. FIG. 4 shows a number of different screens that might be displayed on mobile handset 20. These screens are generated by a software application running on mobile handset 20. The software application on the mobile handset obtains (when the digital content is not already stored in the mobile handset), organizes, displays (both digital content on the mobile handset and the computer 10), stores and plays digital content and can generate the user interface described below.

Screen 50 provides the user with two choices—to view a list of files that have been downloaded from computer 10 ("Downloaded") and are stored on the mobile handset, or to view a list of all files ("All") including the digital content stored on the mobile handset and the digital content stored on the computer 10. If the user selects the "Downloaded" option, then in screen 52, the user can then choose a subset of the files (by artist, album, or playlist) or to view all of them. If the user selects "All," then mobile handset 20 displays all available music files, including files that have been or can be downloaded from computer 10. In this embodiment, song titles in normal, black text already have been downloaded to mobile handset 20, and song titles in gray text have not yet been downloaded but can be downloaded. In Screen 54, the user selects the song "All Night Long," which already has been downloaded, and in Screen 56, the song plays on mobile handset 20 while cover art and other relevant information is displayed for the song "All Night Long."

When the user selects the "All" option in screen 50, the user is presented with a menu (58) that permits the user with options to view all of the digital content (both stored on the mobile handset and stored on the computer) including "All", by Artist, by Album and/or by Playlist. When the user selects to view all of the digital content (which are songs in this example), a screen 60 shows all of the digital content (both on the mobile handset and on the computer) wherein certain pieces of digital content are shown in gray text indicating that those pieces of digital content are stored on the computer and are available for download to the mobile handset and other pieces of digital content are shown in black indicating that those pieces of digital content are stored on the mobile handset. If the user selects "Because of You" (which is shown in gray text), mobile handset 20 then issues a command to computer 10 (36), such as a command to transfer the song "Because of You" from the computer to the mobile handset. Computer 10 responds to the command and transfers the requested digital content to server device 22 (38) and the mobile handset 20 then obtains the digital content from server device 22 (40). Once the piece of digital content (or at least a buffer full of the piece of digital content as the piece of digital content continues to download in the background) is downloaded to the mobile handset, screen 62 then shows the cover art and other relevant information for the song "Because of You" as the song is being played. When the digital content is downloaded onto mobile handset 20, it is played on mobile handset 20 and is also stored in a storage system within mobile handset 20 (such as on Flash RAM chip or disk drive) while it is being played. The digital content (a song in the

example in FIG. **4**) is thus added to the music collection stored on mobile handset **20**. When that song is displayed in a menu in the future, it will be displayed in normal, black text rather than gray text since it has now been downloaded and stored on mobile handset **20**.

In this manner, the digital content on mobile handset **20** can be synchronized with the digital content on computer **10** in a wireless fashion. This allows a user to listen to or watch the digital content that is stored on computer **10**, even when the user is in a location remote from the computer **10**.

Device **22** can implement security or verification measures to ensure that the person operating mobile handset **20** is the same person who owns computer **10**, for copyright protection and other reasons. For example, device **22** can require that computer **10**, when the computer registers with the device **22**, provide device **22** with the phone number for the mobile handset that will be allowed to access the digital content stored on computer **10**. When mobile handset **20** then contacts device **22** with a request to obtain data from computer **10**, device **22** can then determine if the phone number associated with mobile handset **20** is the same phone number that previously had been registered by computer **10**. Device **22** can be designed to proceed with the requested transfer only if the two phone numbers match. Other security or verification measures can be implemented, and this example is only illustrative.

Mobile handset **20** may include circuitry for running an operating system and applications, circuitry for processing data and metadata, and circuitry for rendering and playing the digital content, such as audio content and video content. All of the circuitry can be contained in a single integrated chip, in multiple integrated chips, or in a combination of some number of integrated chips and other electronic components.

A user of mobile handset **20** can run various applications on the handset, such as an application that enables the user to listen to music or to watch video content. Mobile handset **20** can include a video display and a speaker, which would enable a user of mobile handset **20** to watch video content on the video display and listen to audio content through the speaker.

FIG. **5** illustrates another embodiment of the system that allows a mobile handset **20** to share content with a computing device **10**. In this embodiment, the mobile handset **20** can share content with the computing device **10** through the device **22** (as described above), but may also share content/synchronize content with the computing device **10** over a link **70**, such as a cable, a docking station, by removing a memory card from the mobile handset **20** and reading the memory card using a memory card reading device coupled to the computing device **10** or by other wireless protocols such as a Bluetooth network. In this embodiment, the synchronization of the content over the two different methods (through the device **22** and over the link) requires that the system tracks the synchronization by both methods. The system may also permit multiple computing devices and multiple handsets (assuming that the user has the proper authorizations to share the content) to share the content.

The mobile handset may include a content store **71**, such as a database, that may include one or more playlists **72** and the computing device **10** may a content store **74**, such as a database, and one or more pieces of content **75**. In the computing device **10**, the one or more pieces of content may have a plurality of different formats (such as MP3, AAC, ACC+, m4a for music content) and the system may be used with multiple different types of content including music content, photo content, file content, video content, podcasts and any other type of digital content. The computing device, using the content store **74**, identifies any new content files so that those new content files can appear in the user interface of the mobile handset described above and new files downloaded directed to the mobile handset appear in the master content store maintained on the computing device **10**. The content store **71** on each mobile handset may include an identification code (ID) so that the computing device **10** may contain a plurality of content stores for a plurality of mobile handsets wherein the content stores for each mobile handset are distinguished by the identification code. A user can also create a new playlist on the mobile handset that is stored in the content store **71** and then is synchronized back to the computing device **10** so that the computing device also maintains the playlists for the particular mobile handset in the content store for that particular mobile handset as identified by the identification code.

In the system and method described above, the playlists generated on the mobile handset may be an on-the-fly playlist which allows content (both local to the mobile handset and the computing device **10** as well content from any source that can be later pulled down to the mobile handset) to be stored into a playlist on the mobile handset. As above, the on-the-fly playlist may be synchronized back to the computing device **10**. In addition, when content stored on the computing device changes (content is removed, for example or the user no longer has rights to play a particular'piece of content), the on-the-fly playlist (and other playlists on the mobile handset) are automatically updated to reflect those changes.

FIG. **6** illustrates another embodiment of the system that allows a mobile handset **20** to share content among a plurality of computing devices wherein the mobile handset has the content store **71** and playlists **72**. As shown, the system permits the mobile handset **20** to synchronize its content with a plurality of computing devices $\mathbf{10}_1$, $\mathbf{10}_2$, . . . , **10**n and each computing device maintains a content store of the content on the mobile handset. For example, in a family in which the different family members each have their own computing device, the mobile handset of a particular family member can be synchronized to the multiple computing devices so that the content purchased by each member of the family can be shared. Similarly, the system permits multiple mobile handsets to synchronize their content with a single computing device (such as might be the case of a family) or multiple mobile handsets can synchronize their content with multiple computing devices. Thus, the system permits the computing devices to effectively share content between the computing devices.

FIG. **7**A illustrates a piece of content **80** segmented into smaller pieces. In most mobile handsets, it is not possible to download an entire piece of content (or the downloading of the entire content causes an unacceptable delay in the user experience) so that the piece of content is segmented into segments, such as segments **1**-**8**, in order to download the segments to mobile handset. For example, the system is able to download the segments in sequential manner and therefore begin to play the piece of content prior to the entire piece of content being downloaded to the mobile handset that provides a better user experience. A mobile handset, depending on the type of mobile handset, may have a progressive download mode. In the progressive download mode, the mobile handset can start the download of the segments and then start to play the content while the remainder of the segments of the content are downloaded to the mobile handset. If the mobile handset is capable of progressive downloading, then the downloading of the content to the mobile handset is straight-forward. However, if the mobile handset does not support progressive downloading (which is the case for most mobile handsets

such as mobile phones), a buffering method is used to permit the segmentation of the content and then the downloading of the segments of the content.

FIG. **7**B illustrates a method for downloading/streaming content to a mobile handset that does not support progressive downloading. When the mobile handset does not support progressive downloading, the mobile handset does not permit any download into a buffer while any portion of the content is being played from the buffer. The mobile handset **20** includes the application, as described above, that manages the content on the mobile handset and displays the user interface shown in FIG. **4**. In the embodiment in which the mobile handset does not support progressive downloading, the application may also segment a memory space of the mobile handset into a first buffer A and a second buffer B wherein the downloading of the segments of the content occurs by ping-ponging between the first and second buffers. In particular, as shown in FIG. **7**B, a new piece of content (having segments **1-8** in this example) has its first segment downloaded into the first buffer and then the segment is played from the first buffer. While the segment of content is being played in the first buffer, the next segments of the piece of content (which must include the first segment to maintain the file integrity and download the file header) of the piece of content is downloaded to the second buffer B (segments **1-3** in this example). Then, when the first segment is completed, the content in the second buffer starting at segment **2** is played. During the switch from the first buffer to the second buffer, a 20 ms silence occurs but it is not noticeable by the user. As the segments of content are being played from the second buffer B, addition segments (segments **4-6** in this example) are downloaded to the first buffer A (along with the prior segments to maintain content file integrity and download the file header). When the playing of the second and third segments is completed, the mobile handset switches back to the first buffer A so that segments **4-6** can be played. While the segments in the first buffer A are being played, the last segments of the piece of content (along with the prior segments to maintain content file integrity) are downloaded into the second buffer and the mobile handset then plays the remaining segments from the second buffer once segments **4-6** are completed so that the mobile handset ping-pongs between the first and second buffers. The use of the two buffers results in a better user experience since the only silence gaps are approximately 20 ms gaps that are not noticeable by the user and permits streaming of the content. Without the two buffers, a mobile handset that does not support progressive downloading: 1) must wait to play the content until it is completely downloaded (which takes too long); or'2) introduces a pause (2 seconds or more) each time that the mobile handset needs to download the next segments of the content. In addition, a mobile handset that does not support progressive downloading and does not have the two buffers cannot be adaptive to bandwidth changes in the network and thus cannot take advantage of good network coverage and good network speed to provide a better user experience.

In another embodiment, the memory space of the mobile handset may be divided into the first and second buffers (as described above) and a third buffer wherein the segments of the content are downloading into the third buffer so that the third buffer has all of the currently downloaded segments of the content (or all of the segments of the content if the downloading is completed).

The mobile handset application may also include a mode in which the application, when the user is playing a playlist for example, looks ahead in the playlist and downloads the next piece of content in the playlist (if it is not already on the mobile handset) in a streaming manner wherein the first piece of content will have the 20 ms silence gaps (due to the streaming and ping-ponging between the buffers), but any subsequent pieces of content will not have the silence gaps since the subsequent content may be pre-downloaded in the entirety to the mobile handset.

The mobile handset/application of the mobile handset may also include an "airplane" mode in which the mobile handset and application determines when the mobile handset is connected to the network (either the wireless network or the link). When the application determines that the mobile handset does not have any connection to the computing device **10**, the application does not display any content that is only on the computing device **10**, but permits the user to play the content already stored on the mobile handset. However, when the mobile handset is again connected to the computing device **10**, the content on the mobile handset and on the computing device (shown in FIG. **4** above) is again shown to the user.

FIG. **8** illustrates a network aware mobile handset application of the content sharing system. As with the system shown in FIG. **5**, the mobile handset **20** may include the content store **71**, such as a database, that may include one or more playlists **72** and the computing device **10** may the content store **74**, such as a database, and one or more pieces of content **75**. The mobile handset may further include the content application that is executed on the mobile handset. In this embodiment of the system, the computing device **10** or device **22** may have one or more links **24**, **26** that allows the mobile handset **20** to exchange data and information with the computing device **10** or device **22**. The link, in this embodiment, may be one or more different links that each have different characteristics. For example, the links may be cellular/mobile or 3G network **90**, a wireless computer network **92** and a Bluetooth network **94**. Each of these link have different characteristics such as cost to use, bandwidth available and download speed and protocol. For example, a 3G network is expensive, requires a 3G enabled mobile device and has very fast download speeds, a wireless computer network may be free, require a WLAN card or circuit and has a slower download speed as compared to the 3G network.

In the network aware mobile handset application of the content sharing system, the application on the mobile handset has a behavior (when and how its uses each different link when available and how it synchronizes content with the computing device **10** or device **22**) that changes based on the particular link that is available and accessible to the mobile handset. For example, the application on the mobile handset may be configured to download any and all content not already on the mobile handset automatically whenever the mobile handset can access a free link and also configured to only download the next piece of content as needed when the mobile handset has access only to an expensive link, such as 3G. As another example, the application on the mobile handset may have a dormancy timer to turn off network access to an expensive link until a button/user action reactivates the link access. As another example, the application on the mobile handset may disable any content prefetch when the mobile handset can only access an expensive link. As another example, if the user has selected to download a movie onto their mobile handset, the application may stream at a minimum speed when the mobile handset has access only to an expensive link, but may then download the entire movie onto the mobile handset when the mobile handset has access to a wireless computer network which is low cost or free. Thus, the application in the mobile handset has behaviors that change depending on the link access of the mobile handset.

In the embodiments described above, the content system may additionally provide digital content data aggregation. In particular, the system may include a unit/device/module that can aggregate data obtained from users when they upload their digital content into the cloud or computer. This data can include web interaction data (data about the user's browsing, etc.), popularity data, other third party data, playlist information, song playback information (e.g., time of last playback, number of times played over past month, etc.), user profile information (e.g., demographic information), metadata for each piece of digital content (e.g., artist name, title of song, cover art, etc.), lyrics, synching information for the lyrics that can be used to display the lyrics in a synchronized fashion with the digital content, and a digital fingerprint for the song (which is a representation of the digital data constituting the song). In addition to data about the digital content from the user, the content system may also gather third party data that can be combined with the user data to enhance the overall user experience of the content system. For example, the system may gather song popularity information that is generated by a third party. The data can be aggregated in a database and can be used as a basis for providing additional services to users. The services may include: recommendations, lyric synching, social networking, digital fingerprinting and others.

Recommendations: Using the data stored for the user (in the cloud or computer), the system may generate recommendations for the user. In particular, the store for the digital content may include playlists from numerous users. These playlists provide a correlation between pieces of digital content, since the songs on that playlist have something in common—for example, the user who created the playlists likes all of those songs, or those songs all fall within the same genre or other category. This correlation information can be used to generate recommendations. For example, if several playlists contain both Song A and Song B, and a particular user has Song A but not Song B, a recommendation engine of the content system can recommend Song B to that user. Furthermore, the recommendations generated by the content system may be based on digital content of other users as described above as well as digital content of the user. The recommendation feature is discussed in greater detail below.

Lyric Synching: In the current art, service providers can offer lyrics with audio or video content for that, for example, the words to a song can be displayed on a mobile device when the song is playing. One constant challenge is to synchronize the lyrics with the words in the song so that the right lyrics appear right when the same words are being sung. Certain applications allow a user to "click" when the next word in the displayed lyrics is sung so that the system can better synchronize itself. Using the content system, all synching information for a given pairing of digital content and lyrics is aggregated by the content system which then performs a normalization process on that pairing to dampen the affect of the "outlier" data, e.g., synchronization information that is significantly different than the average of the synchronization information collected from all users for that pairing. For example, the system may use a deviation process in which line by line synchronization is performed and the standard deviation is determined to remove outlier data which results in better synchronization of the music to the lyrics.

Social Networking: The content system may also use the uploaded playlists for each user to assist in social networking. For example, the content system can determine that two users have similar musical tastes based on their playlists and then could introduce a user to a different user based on the similarity in musical tastes as determined by analyzing their playlists. The content system would do this introduction because the content system has an API that allows it to interact with various different social networking systems or may have its own social networking/community system. The content system also can be used to recommend music—e.g., once it determines a similarity, it can make recommendations to User A based on User B's playlists, such as "User B listens to Song X but you do not; would you like to try it?" An example of a community user interface of the content system as shown in FIG. **15** wherein the community is within the content system and permits, among other things, personal profiles, connection to social networking sites, such as Facebook, Twitter and MySpace, and the user to share comments and playlists with other members of the community. In addition, the content system may also compare users who have a 90% match in their collections (macro level match) and connect those users to each other.

Digital Fingerprints: Currently, each piece of digital content can be processed to create a digital "fingerprint" for the song, which is a type of unique identifier that is based on the digital content and is useful in ensuring that copyrights are not violated and that appropriate license fees are paid. If users have digital fingerprints for their songs, these fingerprints can be aggregated in a database as well by the content system. These fingerprints can be used for several purposes by the content system. For example, the fingerprints can be used to verify the ID3 tags for a song because, if 80% of all ID3 tags have the same fingerprint, then that fingerprint is likely accurate and those ID3 tags are likely accurate. In one embodiment, the fingerprint can be an ASCII string consisting of up to 16K bits and can be based on the entire piece of digital content and not just a portion of it. The fingerprint of the entire piece of digital content can be used by the system to identify the digital content of other users.

Other: The aggregated data also can be used for other purposes. For example, if a user searches for songs by Artist A, a store of the content system can determine what the five most popular songs by Artist A are (based on the data stored in the database that was collected from users), and it can then show those song in order of popularity among all users represented in the database. The content system also allows a user to search by artist or album and then download (purchase) some/all of the songs for a particular artist or album. An example of a user interface for on-demand digital content of the content system that allows the user to browse and search a library of digital content, play any piece of digital content and add any pieces of digital content to one or more playlists is shown in FIG. **14**.

In addition, since the content system may be used to store the digital content for multiple devices **20** of the user as shown in FIGS. **2**A and **2**B, the digital content lists for each device **20** may be synchronized so that the list of digital content on each device is constantly updated based on the store of digital content in the content system. In addition, when the user buys a new device that has digital content capabilities, the content system may, automatically or on user command, download the digital content list to the new device. The content systems described above also permit two-way synchronization in that digital content (all or a subset) is synchronized from the content store to each device **20** and the digital content on any device **20** may be synchronized back to the content store.

The content system may also provide a playlist creation sub-system in which digital content of the user may be used to seed a new playlist of digital content. Alternatively, a playlist can be generated from a set of recommendations provided to the user. The playlist creation unit may offer a first level of service and an on-demand/interactive level of service. The first level of service may provide playlists generated based on

a user's digital content. The on-demand/interactive level of service may provide playlists based on any digital content on a playlist and allow the user to add or delete digital content/playlists.

The content system may also provide streaming download or progressive download to the devices **20** of the digital content instead of the download of the entire piece of digital content. If the device can accommodate progressive download, then progressive download is used. If the device cannot use progressive download, then streaming download is used. Now, examples of the user interface of the content system are described in more detail.

FIG. **9** illustrates an example of a computer interface **100** of the content system that allows synchronization of digital content and adding digital content. This computer interface can be seen by accessing the content system using a computer, for example. As shown in FIG. **9**, the system may handle movies, music and ringtones wherein the user interface has tabs that can be chosen by the user to view the pieces of digital content of the user associated with each type of digital content. The user interface also may have a lyric portion **102** that displays the lyrics of the digital content being currently played by the user. The user interface also may have a digital content list portion **104** that shows the digital content, the digital content play lists and the various lists of the different types of digital content which may be selected by tabs in the user interface. Each list of digital content may include the following fields including: a name of the digital content, an artist of the piece of digital content, an album that contains the piece of digital content (for music), a genre assigned to the digital content (if any), and a rating of each piece of digital content (if any).

FIG. **10** illustrates an example of a web interface **110** of the content system that allows synchronization of digital content wherein this illustrates an example of a user interface when the user logs into the content system over the web. As shown, the user interface has the same portion **104** as with the computer user interface and also has a condensed digital content control portion **112** that allows the user to start, stop, play, etc. digital content, share content, watch the video associated with the digital content (for music) and see/sync the lyrics with the digital content (for music). The digital content portion **104** in this user interface also has a time period of the digital content field shown that may also be present in the user interface shown in FIG. **9**. For both of the user interfaces of FIGS. **9** and **10**, the content system also allows the user to purchase digital content using, for example, the user interface shown in FIG. **11**. In addition, the content system allows the user to listed to a personal radio station as shown in FIG. **12**.

FIG. **13** illustrates an example of a television interface of the content system wherein the user can interact with the content system from an IP enabled television and thus interact with the digital content. FIGS. **16**A and **16**B illustrate two examples of a user interface of the content system on a device, such as a RIM Blackberry device. FIG. **16**A shows synching of digital content occurring while FIG. **16**B shows the user interface when a piece of digital content being played. Furthermore, FIG. **17** illustrate examples of a user interface of the content system on several different devices including the RIM Blackberry, Motorola Droid and the Apple iPhone.

FIG. **18** illustrates an example of the user interface for songs/playlists available to a device **20** which allow a user of the device to request digital content (songs), playlists (shown in FIG. **18**), artist playlists and album playlists from the digital content stored on the content system. Some of the digital content may be already stored on the device and the remainder can be downloaded wirelessly or over a USB cable as it is needed by the user. FIG. **19** illustrates an example of the user interface for a digital content player on a particular device that allows the user to control playback of the current playing digital content and have additional features specific to the digital content being played by the user. FIG. **20** illustrates an example of the lyric user interface for a digital content system on a particular device in which the user is viewing the lyrics as a song is being played by the user.

For certain devices **20**, there may be some additional features of the content system. For example, the content system may enable live wallpaper (See FIG. **21** for example) in which the wallpaper may be cover art from the music in the content system. The background may be responsive to touch and change slowly when no music is playing and animate during song transitions. The certain devices may also have a desktop widget (See FIG. **22**) that allows the user to control the playing of the digital content. Furthermore, the devices may integrate the content data into a quick search (See FIG. **23**) to find pieces of digital content on the device or available on the computer/cloud. FIG. **24** illustrates an example of a docked playback client of the digital content system on a particular device wherein the user interface has a landscape layout. The device may also integrate the content system into a notification service (see FIG. **25** for example) in which the user has quick access to the current application as well as new/changed content on the computer/cloud.

Social Networking

Other embodiments involve social networking. FIG. **27** illustrates an implementation of an embodiment of a system **210** for content social networking. The system may be implemented as a hardware/software based system in this implementation. The system **210** may include one or more mobile handsets **212** (such as a first mobile handset **212***a* used by User A and a second mobile handset **212***b* used by User B as shown in FIG. **27**) wherein the system allows the users to socially network/flirt with each other using pieces of content. Each mobile handset **220** may be a processing unit based device with sufficient processing power, display capabilities, connectivity capabilities and memory to interact with the system. Each mobile handset, for example, may be a PDA, a mobile phone, a wireless email device (such as the Blackberry or iPhone) that may or may not have phone capabilities, handheld digital content devices (such as iPods and the like) or other handheld device that are capable of downloading and playing digital content.

The system may further comprise a computer **214**, such as one or more server computers, that can be connected to the one or more mobile handsets over one or more links **215**. The links can be any type of link, such as the Internet, and can be hardwired, wireless, or some combination of the two. When the link is wireless, it can be, for example, a cellular telephone network, a WiFi network (such as an 802.11 network), a wireless data network (such as EV-DO or EDGE), or any other wireless networks. The links **215** allows the one or more mobile handsets **212** to exchange data and information with the computer **214** including digital content as described below in more detail. The computer **214** may have the appropriate one or more interfaces/circuitry that allow the mobile handsets to connect to and interact with the computer **214**.

Each mobile handset **212** may further comprise a storage device **216**, such as a hard disk drive, flash memory etc. that may be volatile or non-volatile, that stores one or more pieces of digital content **218** on the mobile handset **212**. The digital content may be a song, a video, a picture, a podcast, a radio feed, an application, a document, music lyrics, artists' bios, concert information, or any other piece of digital content, and the storage device **216** may store one or more of these different types of digital content. Each mobile handset may also

include a display **220** that allows the user to scroll through a user interface to select a piece of digital content to interact with. Each mobile handset may also include an interface (not shown) that allows the user to plug in a set of earphones, speakers etc into the mobile handset as well as a processing unit (not shown) that controls the operation of the mobile handset and a power source (not shown) to power the circuitry of the mobile handset. Each mobile handset may also include a input device that allows the user to interact with the mobile handset and connectivity circuitry (not shown) that allow the mobile handset to connect to and interact with the computer **214**. For a wired link **215**, the connectivity circuitry may be an interface that allows a conductor to be plugged into the mobile handset. For a wireless link **215**, the connectivity circuitry may be wireless circuitry that allows the mobile handset to interact wirelessly with the computer **214**.

The computer **214** may further comprise one or more processing units, storage devices and interfaces (not shown) as well a content networking unit **230** (implemented as a plurality of lines of computer code that are executed by the one or more processing units of the computer **14** in this embodiment) that performs various content social networking as described below in more detail. The computer **214** may further comprise a content storage **232** (implemented as a plurality of lines of computer code that are executed by the one or more processing units of the computer **214** in this embodiment) that stores content and allows a user to catalog and organize the digital content of the user. The content storage **232** may also have a listing of the pieces of digital content for each user (a library) which are pieces of digital content that the user has the rights to interact with. The content networking unit **230** may further comprise a content identification unit **234** (implemented as a plurality of lines of computer code that are executed by the one or more processing units of the computer **214** in this embodiment) that identifies content received by the computer from the one or more mobile handsets **212** and/or determines that the received content is or is not already stored in the content storage **232**. The networking unit may further comprise a network unit **236** (implemented as a plurality of lines of computer code that are executed by the one or more processing units of the computer **214** in this embodiment) that determines the networking action to perform in response to the received content as described below with reference to FIG. **28**. The content networking unit **30** thus may implement social networking among its users based on pieces of digital content as described below. Now, an example of the content social networking implemented by the system shown in FIG. **27** is described with reference to FIG. **28**.

FIG. **28** illustrates an example of a method **250** for content social networking that may be implemented using the system shown in FIG. **27**, but may also be implemented using other systems. In the method, a user of a first mobile handset may interact with a piece of digital content (**252**) such as by the user playing/viewing the piece of content or browsing the piece of digital content. When the user interacts with the piece of digital content, the user optionally may also identify a person (a second user) who the user wishes to socially interact with/flirt with. The piece of digital content (or an identifier) and optionally the identity of the second user are sent to the computer **214** shown in FIG. **27**. The computer **214** identifies the piece of digital content (by using the content identification unit **34** of FIG. **27**, for example) and then provides a service associated with the identified piece of digital content to a user of a second mobile handset (**254**) such as by using the network unit **236** of FIG. **27**. For example, the service may allow the first and second user to social network/flirt with each other using the piece of digital content based on the provided identifier of the second user. Alternatively, users may agree to socially network using the system and then the system will display what pieces of digital content each user, who agreed to socially network, is interacting with so that anyone can then communicate with the other users or with the system. As another alternative, the system may select one or more users to whom the received piece of digital content is to be shared based on various criteria. The criteria can include geographic proximity, membership in a social network or a "friends list," or belonging to a common service or network. The criteria can select from a private group (e.g., a user's social network) or a public group (e.g., all wireless customers of Sprint®).

The service associated with the piece of digital content may be varied. For example, the computer **214** shown in FIG. **27** may send the piece of identified digital content to the second user with an indication that the piece of digital content originated from the first user. As another example, if the identified piece of digital content is also in the library of the second user, then the computer **214** shown in FIG. **27** may provide an indication that the piece of digital content originated from the first user and allows the second user to interact with the identified piece of digital content (**256**) such as by using the second mobile handset. As another example, if the identified piece of digital content is not in the library of the second user (so the second user does not have rights to interact with the identified piece of digital content), then the computer **214** shown in FIG. **1** provides an indication that the piece of digital content originated from the first user and allows the second user to purchase the identified piece of digital content (**256**) such as by using the second mobile handset so that the second user can then interact with the piece of digital content. In this manner, the system shown in FIG. **1** may be used by the users to social network/flirt with each other using a piece of digital content. This communication can occur through SMS messaging, communication mechanisms offered by a social network such as Facebook®, or communication mechanisms offered by an application running on the mobile handset.

FIG. **29** illustrates an implementation of another embodiment of the system **10** for content social networking that incorporates geography. In this figure, elements with the same reference numerals as shown in FIG. **27** are the same and perform the same operations and functions and therefore will not be further described with respect to FIG. **29**. In this implementation, the location of each user may be used to determine which users are able to social network/flirt with other users or the system may select the other users to social network/flirt with based on the locations of the users as described below with reference to FIG. **30**. To implement this embodiment of the system, each mobile handset **212** has a unit **219** that determines the location of the mobile handset so that the location of the mobile handset can be transmitted to the computer **214**. As an example, the unit **219** may be known GPS circuitry and software or it may be software that determines the position of the mobile handset based on the wireless link towers. The content networking unit **230** may further comprise a unit **238** (implemented as a plurality of lines of computer code that are executed by the one or more processing units of the computer **214** in this embodiment) that receives the location information from the mobile handsets, processes the location information as needed and supplies the location information to the network unit **236**. The network unit **236**, in this embodiment, may then use the location information of each mobile handset to determine which users to social network together using the piece of digital content. In particular, it is more likely that users in a particular geographic area (same town, for example) are more likely to

social network and date each other than users in disparate geographic areas. Thus, as shown in FIG. **30**, the mobile handsets in a first geographic area **270** may be socially networked together using the system while users in the outer geographic area **272** are not socially networked to each other due to the distance between the users. The system shown in FIG. **29** may also be used to determine the type of digital content being interacted with by users in a particular geographic area and then socially networking those users in the particular geographic area together as described above.

Alternatively, the system can determine the digital content that users in a particular geographic area are interacting with and then display representations of the users and their digital content to the other users of the system. For example, in FIG. **31**, mobile handsets **212***a*, **212***b*, and **212***c* are within a first geographic area **270**. The users operating those mobile handsets already are part of an existing social network, such as through Facebook®. The system shown in FIG. **29** will recognize that handsets **212***a*, **212***b*, and **212***c* are being operated by members of an existing social network and will then transmit information regarding one or more of them to one or more of the others. For example, mobile handset **212***a* at a particular moment in time may be associated with content **280**. Content **280** could be a ringtone, music clip (such as a favorite song), video clip, artwork or other media content. The system shown in FIG. **29** will transmit this information to mobile handset **212***b* (for example), and mobile handset **212***b* can then show its user that mobile handset **212***a* and its user are associated with content **280** and are located at a particular geographical location. For example mobile handset **212***b* can generate a map showing first geographic area **270**, the location of mobile handset **212***a* within that first geographic area **70**, and information regarding content **280** associated with mobile handset **212***a* (for example, a pop-up window associating mobile handset **212***a* with a music clip or a depiction of a music clip that is currently playing on mobile handset **212***a*). In this manner, a member of a social network can learn which members of their social network are in close physical proximity to him or her, and also can learn what those members are doing at the present time by receiving information about content associated with the mobile handsets operated by those members at a particular moment in time.

FIG. **32** shows an exemplary graphical user interface for a mobile handset. It shows display screen **300** of mobile handset **212***b*. Display screen **300** generates a map **310** showing the geographic location of mobile handset **212***a* and mobile handset **212***b*. Display screen **300** displays content information **320** concerning mobile handset **212***a*. In this example, the mobile handset **212***a* is playing "Ode to Joy" at that particular moment in time (for example, as a music clip, ring tone, streaming audio, etc.). Content information **320** shows information about that content, for example, the title ("Ode to Joy"), cover art, artist information, metadata, etc. Content information **320** optionally includes selector **130** that permits the user of mobile handset **212***b* to perform an action relating to mobile handset **212***a*, the user of mobile handset **212***a*, and/or the content associated with content information **320**. For example, selector **330** can include a button that permits the user of mobile handset **212***b* to purchase or sample the content associated with content information **220** (for example, to listen to a clip of "Ode to Joy"), or to communicate with mobile handset **212***a* (for example, to send an SMS message, email, or a message via a social networking communication mechanism). One benefit of this embodiment is that the user of mobile handset **212***b* will know that the user of mobile handset **212***a* is nearby and will learn what he or she is doing at that moment in time with regard to digital content.

Although parts of the preceding discussion have focused on social networks, the same concepts can be applied to other groups or characteristics of users. For example, the same actions described previously with reference to FIG. **31** can be applied to all users who subscribe to the same service (e.g., a streaming radio service) or who have other characteristics in common (e.g., all users who have identified themselves as fans of a particular musical group), instead of all users who are part of the same social network.

Recommendation Engine

In other embodiments, a recommendation engine is used. With reference to FIG. **33**, computing device **28** of previous figures is depicted. As stated previously, computing device **28** may be a computing cloud (with a plurality of processing unit based devices, storage devices, etc.). Computing device **28** comprises a content store **400**, such as a database. Content store **400** optionally creates and maintains data structures, such as a database table, for each user who has registered with or is otherwise known to computing device **28**. For instance, data structure **401** can be assigned to User **1**, data structure **402** can be assigned to User **2**, etc. In this manner, a data structure can be assigned to each of the N Users, where N is the total number of users of a particular service offered by computing device **28**.

As an example, when the relevant digital content is music, each data structure, such as data structures **401**, **402**, . . . , **40***n*, optionally can include fields such as the following: an ID for the user, playlists (including the name of the playlist, other identifiers for the playlist, titles of the songs on the playlist, and other identifiers for the songs on the playlist), metadata for all stored songs, ratings for each song (whether by that user, other users, or an aggregate of users), the frequency with which the particular user has played each particular song (e.g., 8 times over the past 7 days), the time elapsed since the particular user has played each particular song (e.g., 256 minutes), the timestamp of the last time the particular user played each particular song, and IDs for other users of the service offered by computing device **28** who are within that particular user's social network (such as within Facebook®). Optionally, instead of playlists, the same approach can be used to track personalized radio stations or other collections of content accessed by each user. In addition to music, data structures can be created for other types of digital content as well (such as video, TV, movies, commercials, advertisements, etc.) that may or may not have similar fields to those shown in FIG. **33**.

Identification information for persons who are within a particular user's social network can be readily obtained using publicly known APIs offered by providers of social networks. For example, computing device **28** can communicate with computing device **405** that is associated with the service that provides a social network (such as a server for Facebook®). This communication can occur via an API or other communication mechanism. Once obtained, the identification information for persons within a particular user's social network can then be compared to information provided to computing device **28** by all users, and computing device **28** can then determine which users are within the same social network.

With reference to FIG. **34**, in another embodiment, content store **400** optionally creates and maintains data structures, such as a database table, for sequences of digital content that it receives and offers to its users. Examples of such sequences can include radio feeds or radio stations, video feeds or video stations, TV content, collections of commercials or advertisements, or other sequences of digital content.

For example, computing device **28** can be configured to receive live content feeds from content sources **411**, **412**, **413**,

and others (that may be, for example, radio sources). In one example, the Radio Sources **411**, **412**, **413**, and others are computing devices that send live radio feeds over the Internet using standard HTTP communications and standard Internet radio formats such as SHOUTcast or Icecast. In this example, when the sources are radio stations, data structure **421** can be assigned to Radio Source **411**, data structure **422** can be assigned to Radio Source **412**, etc. In this manner, a data structure can be assigned to all M content sources, where M is the total number of content sources monitored or received by computing device **28**. Each data structure, such as data structures **421** and **422**, optionally can include fields, when the content sources are radio sources, such as the following: an ID for the radio source or radio feed, metadata for all songs played on that radio source or radio feed (including a running log of all songs played), ratings for each song (whether by that particular user, other users, or an aggregate of users), the frequency with which the radio source or radio feed has played (or streamed, downloaded, transmitted, etc.) each particular song (e.g., 14 times over the past 7 days), the time elapsed since the particular radio feed has played (or streamed, downloaded, transmitted, etc.) each particular song (e.g., 378 minutes), the timestamp of the last time the particular user played each particular song, and IDs for users who have listed to the radio source or radio feed and related metadata. Optionally, each data structure can be configured to store data for only the last R songs played (or streamed, downloaded, transmitted, etc.), where R is an integer chosen to correspond to an approximate time period of interest. For example, because musical popularity changes very quickly, R may be chosen to be 1000, as 1000 songs might be the approximate number of songs played in one week by a radio source. Using this approach, the data structures would contain data that reflects the most current trends in popularity of particular songs and radio feeds. The data can be collected from all devices used by each user, such as in the configuration previously described with reference to FIG. **2**B. Instead of radio sources or radio feeds, data structures can be created for virtually any type of sequence of content, such as video stations or video feeds, TV stations, etc.

It should be evident that content store **400** can collect a vast amount of data that indirectly reflects the relative popularity of each particular piece of digital content. With reference to FIG. **35**A, content store **400** is accessed a by recommendation engine **430**. Recommendation engine **430** comprises a computing device that runs an application or lines of code that perform the recommendation functionality described herein. Recommendation engine **430** optionally can be within computing device **28** (e.g., as a component within a cloud system), or it can be separate from computing device **28**.

Recommendation engine **430** receives one or more inputs and creates a recommendation **440** as an output in real-time. The inputs can include data stored in content store **400** as described previously with reference to FIGS. **33** and **34**. For example, if User **1** has a social network through Facebook®, recommendation engine **430** can compare the playlists of User **1** (as stored in data structure **401**) to the playlists of other users who are within User **1**'s social network. In one embodiment, recommendation engine **430** can find the user within User **1**'s social network who has playlists that most closely match those of User **1** (either on a playlist-by-playlist basis or in the aggregate). For example, suppose that User **2** is within User **1**'s social network, and that User **1** has a playlist X and User **2** has a playlist Y and 80% of the songs on playlist X are on playlist Y and that this is the closest match among all of User **1**'s playlists and all the playlists of all users within User **1**'s social network. Recommendation engine **430** will identify playlist Y as being a close match to one of User **1**'s playlists (playlist X).

Recommendation engine **430** will then identify the songs on playlist Y that are not on playlist X, and it can then recommend one or more of those songs to User **1**. To enhance the social networking experience, recommendation engine **430** can inform User **1** that User **2** likes that particular song or songs, for instance, with a message that says, "Your musical tastes are similar to John [User **2**]. He likes 'Firework,' which is not in your library. Click here to listen to or purchase it." In another embodiment, recommendation engine **430** can ask User **1** if User **1** wants to send a recommendation to User **2**, as a mechanism for enhancing the social networking experience. For example, recommendation engine **430** can send a message to User **1** that says, "Based on the musical tastes for you and User **2**, we think User **2** would like 'Firework,' which is in your library but not User **2**'s. Click here to send a recommendation to User **2** for that song." If User **1** clicks the selection field, recommendation engine **430** would then send the recommendation to User **2** and indicate that it came from User **1**. In yet another embodiment, recommendation engine **430** can perform the same type of comparisons described above for other digital content, such as other audio content, movies, other video content, commercials, or any other digital content.

Recommendation engine **430** can be configured to apply different weighting coefficients to each element considered in making a recommendation. For example, it can apply a different weight to each of the elements stored in the data structures described previously with reference to FIGS. **33** and **34**. It can then apply the coefficients to generate a number that reflects a raw value of a particular item, and it can then recommend the item with the highest raw value. The social network or social graph itself can be used as a weighting factor by recommendation engine **430**. For example, if a particular song is on the playlist of a member of a particular user's social network, then recommendation engine **430** will give it a greater weight in deciding what to recommend than would be the case had that member not been the particular user's social network. An example of a formula that can be used to generate the raw number for each item as to User X (to determine which item to recommend to User X) is the following:

For Song Y:	
Coefficient	Item
1.0	Percentage of Number of Times Song Y was Listened to By Members of User X's Social Network Compared to All Songs Within Last 24 Hours (normalized to scale of 0.00 to 1.00)
0.5	Percentage of Number of Times Song Y was Listened to By Users Who are Not Members of User X's Social Network Compared to All Songs Within Last 24 Hours (normalized to scale of 0.00 to 1.00)
1.0	Average Rating of Song Y By Members of User X's Social Network (normalized to a scale of 0.00 to 1.00)
0.25	Average Rating of Song Y by Users Who are Not Members of User X's Social Network (normalized to a scale of 0.00 to 1.00)
2.0	Percentage of Radio Stations that Have Played Song Y In Last 24 Hours (normalized to a scale of 0.00 to 1.00)

In this example, each coefficient would be multiplied by its corresponding item, and the results would be summed to create a raw value. The item with the highest raw value that is not already in User X's library (or playlist, etc.) would be

recommended to User X. These coefficients are merely exemplary and could be chosen to place greater or lesser weight on each item. As will be apparent in this example, greater weight can be placed on the activities of members of User X's social network compared to the user base in general.

In another embodiment, recommendation engine **430** can instead create recommendations using data collected from all users by using a vector method that is well-known in the art and is commonly used for recommendations made by retail websites. With reference to FIG. **35**B, in a different embodiment, recommendation engine **430** comprises a first engine **431** which generates recommendations based upon a first set of users and a second engine **432** which culls the results of first engine **431** based upon a second set of users that is a sub-set of the first set of users. For example, first engine **431** might perform actions based on data from all users of a service offered by computing device **28**, and second engine **432** might cull the results from first engine **431** by selecting results that correspond only to members of the particular user's social network. In this particular example, second engine **432** would comprise a social graph filter. Thus, in this embodiment, recommendation engine **430** would find the top users who most closely match the taste of a particular user, and then compare those users against the members of the particular user's social network, and if a match is found, issue a recommendation based on the member with the closet match.

In another embodiment, recommendation engine **430** can recommend a sequence or source of digital content for a particular user. For example, if a playlist or the total collection for User **1** has a close overlap with music recently played by an Internet radio source or radio feed (such as by comparing the last Q songs that User **1** has listened to with the last R songs that each radio source or radio feed has played and identifying the radio source or radio feed with the largest number of songs that also were listed to by User **1**), recommendation engine **430** might recommend that radio source or radio feed to User **1**, perhaps with a message that says, "Based on your musical taste, we think you would like the WABC radio station. Click here to access it" on the user interface of the user's computing device

In another embodiment, recommendation engine **430** can determine the most popular song listened to or played by all users within a particular user's social network that the particular user does not yet have in his or her collection. It can then recommend that song to the particular user, perhaps with a message that says, "The most popular song listed to by people in your social network that you do not have in your collection is 'California Girls.' Click here to listen to or purchase it" on the user interface of the user's computing device.

Recommendation engine **430** and computing device **28** can be utilized to provide metrics to a particular user regarding patterns in that user's interactions with digital content. For example, because computing device **28** captures metadata for all digital music listened to by a particular user, computing device **28** can provide a graph, pie chart, or other descriptive image or data that shows the user's listening habits by genre, time period of music, or other aspect of the digital music. For example, computing device **28** can create a graph that shows the number of songs listened to by the user over a certain time period from the 1970s, 1980s, 1990s, 2000s, and 2010s. Recommendation engine **430** can them make a recommendation to the user. For example, if that user predominantly listens to music from the 1970s, recommendation engine **430** might inform the user, "You are stuck in the 1970s. You should listen to Song X, or Radio Station Y," where Song X is a recently-released song, and Radio Station Y mostly plays "current" music. Computing device also might provide the user with a pie chart indicating the proportion of songs listened to by the user over a certain time period that falls within each genre (Classic Rock, Hip Hop, etc.). Recommendation engine **430** then might inform the user, "You like Hip Hop music. You might enjoy Song X, or Radio Station Y," where here Song X is an R&B song, and Radio Station Y mostly plays R&B music. In this manner, the user learns about his or her own listening patterns, and recommendation engine **430** makes suggestions to the user that is designed to broaden that user's listening experience by exposing the user to music that is different but likely to be enjoyed by that user based upon correlations identified by recommendation engine when examining data stored in content store **400** collected from other users.

Computing device **28** also can indicate changes in listening patterns over time. For example, it can show a chart describing a user's listening patterns by month, or by year, so that the user can see how his or her tastes have changed over time.

In yet another embodiment, computing device **28** and/or recommendation engine **430** can generate charts or other data regarding the listening habits of all users or a sub-group of users (such as users within a social network). For example, it can send a list or graph of the most popular songs within a certain time period (based on, for instance, the song that was most frequently played over the past week). It also can send a list of graph of the most popular songs within a certain time period for users within a social network. ("The most popular song among you friends this week was 'Firework.'"). This also can be offered for other collections of people (e.g., all students at Stanford University). This is another way of exposing users to new music. In a variation of this embodiment, computing device **28** can provide this information to users by a news feed (such as through Twitter® or other devices), so that users will be provided with this information in real-time.

Computing device **28** also can inform a user whether his or her musical tastes are "hip" compared to the all users of computing device **28** or all users within that particular user's social network. Computing device **28** can compare a list of the most popular songs within all users or a particular user's social network with that particular user's listening habits over time. If the user listened to those songs several days or weeks before they became popular, then computing device **28** can inform the user that he or she is a "hip" music listener because he or she listened to music before it became popular. This will incent users to listen to music as soon as it becomes available to see if they can predict popularity.

In another embodiment, recommendation engine **430** or computing device **28** can provide a particular user with access to the playlists or other metadata of other users within that particular user's social network. This would allow, for instance, someone to see which songs their friends are listening to, and perhaps to have the option to purchase or sample that music.

In another embodiment, recommendation engine **430** can recommend to a particular user that they add another user to his or her social network based on the metadata collected for each one. For example, if the musical tastes of User **1** and User **2** are similar (based on a comparison of their playlists or listening habits) and User **1** and User **2** are not in the same social network, then recommendation engine **430** can send a message to User **1** such as "Your musical tastes are very similar to those of John [User **2**]. Click this link to invite John to your social network" on the user interface of the user's computing device.

In another embodiment, recommendation engine **430** can create a new social network based on the musical tastes of two or more users. For example, if a collection of users have a substantial overlap in their playlists or listening habits, then recommendation engine **430** could invite them to join a new social network centered around the prevalent type of music (e.g., the Classic Rock User Network).

In yet another embodiment, recommendation engine **430** can recommend an entire set or playlist of content instead of just an individual piece of content. It can generate this set or playlist using the same methodology described previously.

In yet another embodiment, computing device **28** and content store **400** can gather and store information regarding other activities performed by users, such as links/URLs selected through a web browser or coupons or advertisements viewed or clicked upon. With reference to FIG. **36**, User **1** operates device **451**, User **2** operates device **452**, and User **3** operates device **453**. Computing device **28** and content store **400** collect information regarding all items selected by each user (such as links/URLs, coupons, advertisements, etc.). Content store **400** optionally includes a data structure for each user (such as Data Structure **461** for User **1** and Data Structure **462** for User **2**). These data structures can include the following fields: User ID, metadata for all links/URLs selected, metadata for all advertisements viewed or selected, and metadata for all coupons viewed or printed. This data can then be accessed by recommendation engine **430** to create additional recommendations for a particular user, such as websites he or she is likely to enjoy (based on the history of links/URLs selected by other persons whose activities closely match those of the user), or coupons or advertisements he or she is likely to enjoy (again, based on the correlation between the user's history and those of other users with similar histories). These recommendations optionally can be constrained within that user's social network. For example, a message can be sent to User **1** stating, "10 of your friends in your social network printed the following coupon for Acme Materials today."

In yet another embodiment, with reference to FIG. **37**, an advertising engine **470** generates one or more advertisements **480** for a particular user based at least in part on data received from recommendation engine **430** and/or the content store **400**. These ads can be chosen based on the online activity of members of a particular user's social network. For example, if Advertisement X was the most popular ad within the social network (based on times viewed or clicked, etc.), then recommendation engine **430** and/or content store **400** can recommend to advertising engine **470** to send Advertisement X to that particular user.

In yet another embodiment, with reference to FIG. **38**, computing device **28** and content store **400** can gather and store information regarding retail activity. Computing device **28** can obtain data from retail database **471**, retail database **472**, etc. These retail databases can be associated with a retail website, a "brick and mortar" store, or any other collection of retail data. Content store **400** optionally includes a data structure for each item, such as data structure **481** for item **1**, data structure **482** for item **2**, etc. The data structures **481** and **482** can include the following fields: item ID (such as a SKU number), quantity sold in particular time period (e.g., number sold in last 24 hours), elapsed time since last sale (e.g., 3 minutes), average number sold per time period (e.g., 27 per day over the last 7 days), and IDs of users who purchased the item and related metadata (date and time of purchase, quantity, etc.). Recommendation engine **430** then can generate recommendations for retail items based on the data collected (e.g., "Seven people in your social network have purchased Item X. Click here to purchase it.") on the user interface of the user's computing device.

Dynamic Content Verification

Another embodiment involves a variation of the system shown in FIG. **2**A and previously described, and will be described with reference to FIG. **2**A and FIGS. **39**A and **39**B. In this embodiment, as in certain previous embodiments, computer **10**, device **20**, and device **22** contain a list of the digital content of the user. The user adds digital file **520** to computer **10** (step **500**). Computer **10** creates an updated list **530**, and the new list or the updates are sent to device **22**, which also creates updated list **530** (step **502**). The user later requests digital file **520** on device **20** (step **504**) using one of the embodiments previously described. Device **20** requests digital file **520** from device **22** (step **506**). Device **22** sends a query to computer **10** regarding digital file **520** (step **508**). Computer **10** verifies the status of digital file **520** and sends a response to device **22** (step **510**). Step **510** optionally can include running a process to determine if the user has legitimate ownership rights to digital file **520**, such as by generating a digital fingerprint for digital file **520** and comparing the digital fingerprint to a database of known, verified digital fingerprints to determine if digital file **520** was purchased legitimately or if it is an illegal "bootleg" copy. If computer **10** confirms the positive status of digital file **520** (such as by confirming that it was purchased legitimately), device **22** sends digital file **521** to device **20** (step **512**). Digital file **521** contains the same exact content as digital file **520**. However, digital file **521** was already stored in device **22** (as might be the case if device **22** contains a large collection of digital content, such as one might find in an online catalog or music provider), and therefore, digital file **520** need not be uploaded to device **22** from computer **10**, which would reduce the waiting time for the user and would minimize the use of bandwidth between computer **10** and device **22**.

Additional detail for an optional implementation of step **510** will now be described with reference to FIG. **40**. The concept of a digital fingerprint was described previously. An additional method and system for generating a unique digital ID for a piece of digital content was described in U.S. patent application Ser. No. 11/874,720, filed on Oct. 18, 2007, and issued as U.S. Pat. No. 7,917,083 ("Tang"), on Mar. 29, 2011, the content of which is hereby incorporated by reference as if fully set forth herein. Tang discloses a type of digital fingerprinting that can be used with the embodiments described herein. With reference now to FIG. **40**, computer **10** generates digital fingerprint **550** for digital file **520** (step **540**), using the method and system of Tang or some other known method and system. Computer **10** compares digital fingerprint **550** against database **560** containing a plurality of digital fingerprints for digital content (step **542**). Database **560** can be part of computer **10**, or it can be accessed by computer **10** over a network.

For example, known services such as the Gracenote™ service offered by Gracenote, Inc., maintain a database of digital fingerprints for copyrighted music recordings and files and will make its database available for a fee. When used in conjunction with the Gracenote™ service, computer **10** will send database **560** (in this example, a server associated with the Gracenote™ service) a digital fingerprint that was generated on computer **10** using an algorithm provided as part of the Gracenote™ service, and database **560** will send back a "song key" to computer **10**. The song key can then be compared to a table of song keys previously provided to computer **10** by the Gracenote™ service, and if a match is found, then computer **10** can conclude that digital file **520** is a confirmed,

legitimate file, and the table can be used to obtain information about the song, such as title, artist, recording date, etc. Another known fingerprinting service is Echoprint by The Echo Nest.

Regardless of the exact type of database **560** used, step **542** will indicate if digital file **520** is a file obtained legally or if it is an illegal "bootleg" copy or a file that cannot be identified confirmed to be legitimate. Finally, computer **10** obtains the result of step **542**, which indicates if the digital fingerprint indicates that digital file **520** is a legal copy or not (step **546**). If digital file **520** is a legal copy, then device **22** sends digital file **521** to device **20** (step **512**, described previously). If digital file **520** is not confirmed to be a legal copy, then device **22** can optionally send a message to device **20** indicating that it cannot send digital file **520** or digital file **521** to device **20** unless the user pays a fee to obtain the appropriate license rights to that file.

In a variation of this method, computer **10** can instead send the digital fingerprint **550** to device **22**, and device **22** can compare digital fingerprint **550** against database **560** to determine if digital file **520** is a legal copy.

Another embodiment involves a variation of the system shown in FIG. **2**B and previously described, and will be described with reference to FIG. **2**B and FIGS. **41**A and **41**B. In this embodiment, as in certain previous embodiments, devices **20** and computing, cloud **28** contain a list of the digital content of the user. The user adds digital file **520** to a first one of devices **20** (step **600**). The first one of device **20** creates an updated list **530**, and the new list or the updates are sent to computing cloud **28**, which also creates updated list **530** (step **602**). The user later requests digital file **520** on a second one of devices **20** (step **604**) using one of the embodiments previously described. The second one of devices **20** requests digital file **520** from computing cloud **28** (step **606**). Computing cloud **28** sends a query to the first one of devices **20** regarding digital file **520** (step **608**). The first one of devices **20** verifies the status of digital file **520** and sends a response to computing cloud **28** (step **610**). Step **610** optionally can include running a process to determine if the user has legitimate ownership rights to digital file **520**, such as by generating a digital fingerprint for digital file **520** and comparing the digital fingerprint to a database of known, verified digital fingerprints to determine if digital file **520** was purchased legitimately or if it is an illegal "bootleg" copy. If the first one of devices **20** confirms the positive status of digital file **520** (such as by confirming that it was purchased legitimately), computing cloud **28** sends digital file **521** to device **20** (step **612**). Digital file **521** contains the same exact content as digital file **520**. However, digital file **521** was already stored in computing cloud **28** (as might be the case if computing cloud **28** contains a large collection of digital content, such as one might find in an online catalog or music provider), and therefore, digital file **520** need not be uploaded to computing cloud **28** from the first one of devices **20**, which would reduce the waiting time for the user and would minimize the use of bandwidth between the first one of devices **20** and computing cloud **28**.

Additional detail for step **610** will now be described with reference to FIG. **42**, which is similar to FIG. **40**. The first one of devices **20** generates digital fingerprint **550** for digital file **520** (step **640**), using the method and system of Tang or some other known method and system. The first one of devices **20** compares digital fingerprint **550** against database **560** containing a plurality of digital fingerprints for digital content (step **642**). Database **560** can be part of computer **10**, or it can be accessed by computer **10** over a network. Regardless of the exact type of database **560** (Gracenote™, etc.) used, step **642** will indicate if digital file **520** is a file obtained legally or if it is an illegal "bootleg" copy or a file that cannot be identified or confirmed to be legitimate. Finally, the first one of devices **20** obtains the result of step **642**, which indicates if the digital fingerprint indicates that digital file **520** is a legal copy or not (step **646**). If digital file **520** is a legal copy, then computing cloud **28** sends digital file **521** to the second one of devices **20** (step **612**, described previously). If digital file **520** is not confirmed to be a legal copy, then computing cloud **28** can optionally send a message to the second one of devices **20** indicating that it cannot send digital file **520** or digital file **521** to the second one of devices **20** unless the user pays a fee to obtain the appropriate license rights to that file.

In a variation of this method, the first one of devices **20** can instead send the digital fingerprint **550** to computing cloud **28**, and computing cloud **28** can compare digital fingerprint **550** against database **560** to determine if digital file **520** is a legal copy.

The benefits of the embodiments described with reference to FIGS. **39-42** are numerous. For example, it typically takes existing systems around 3 seconds to create a digital fingerprint for a music file. If a user loads **1000** songs onto computer **10** or a first one of devices **20**, then creating digital fingerprints for all of those songs would take around 3000 seconds. The embodiments of FIGS. **39-42** would enable the system to perform the digital fingerprinting process "on demand" so that when a user wishes to listen to a particular song on a second device shortly after loading a large collection of songs onto a first device, the system can perform the digital fingerprinting process only on that song (which will take around 3 seconds) and thereafter verify that the user has the rights to obtain a copy of the song on that second device. By contrast, without these embodiments, the system would need to finish creating the digital fingerprints for the entire collection of newly loaded songs (or at least up until the point where the digital fingerprint is created for the song in question) before it would be ready to receive such a request to determine if a user has rights to a particular song in that collection to enable it to be sent to the second device.

Improved Playback of Digital Content

Another embodiment provides an improved method and system for the play back of digital content. With reference to FIG. **43**, device **20** maintains queue **700**. Queue **700** is a data structure stored in memory or another storage device. Queue **700** contains exemplary entries **710**, **720**, **730**, and others. Queue **700** can include pieces of digital content selected by a user, such as songs that the user wishes to listen to. When device **20** is configured to play entries within the queue, it will start with the first entry **710**. Once it is finished playing first entry **710**, it will then play the second entry **720**, and so on. At any point while device **20** is playing an entry within queue **700**, the user can navigate through other screens shown on device **20** and can view items associated with another data structure **750**. Data structure **750** can be an album, playlist, collection of music of video, a "top **10**" list, or any other assortment of digital content. In this example, data structure **750** is a playlist including items **760**, **770**, and **780**, which in this example are digital songs. Here, the user selects item **760** for playing. At that point, device **20** stops playing from queue **700** and begins playing item **760**. Device **20** can optionally enter an "autofill mode." If it does enter autofill mode, when device **20** has finished playing item **760**, it will then start playing item **770** from data structure **750**, and then will play item **780**. If at any time, the user selects a "back" or "previous song" command, then device **20** will play the previous song actually played on device **20**, whether the prior song was from queue **700** or from data structure **750**. Using this autofill

feature, there is no "downtime," and device **20** is able to continue playing even though the user navigated away from queue **700**. This embodiment facilitates the ability of the user of device **20** to explore various pieces of digital content.

While the foregoing has been with reference to particular embodiments of the invention, it will be appreciated by those skilled in the art that changes in these embodiments may be made without departing from the principles and spirit of the invention, the scope of which is defined by the appended claims.

The invention claimed is:

1. A computing cloud comprising:

a computing device including a content store that stores multiple sets of metadata for multiple users of a social network, wherein each set of metadata corresponds to a user of the social network and comprises information relating to activity of the user and at least one digital content playlist including digital content accessed by the user; and

a recommendation engine, associated with the content store, to:

provide at least one user of the social network with information relating to one or more user interaction patterns of the user with digital content over time;

based on the multiple sets of metadata, compare an at least one digital content playlist of a first user of the social network to an at least one digital content playlist of other users of the social network to identify a second user of the social network with a digital content playlist that most closely matches the at least one digital content playlist of the first user; and

provide a recommendation for digital content to the first user based in part on a first set of metadata corresponding to the first user, a second set of metadata corresponding to the second user, the social network, and information relating to one of more user interaction patterns of the first user to digital content over time,

wherein for at least one user of the social network, information relating to one or more user interaction patterns of the user with digital content over time includes metric information identifying the one or more user interaction patterns.

2. The apparatus of claim **1**, wherein:

the social network provides a social connection between the first user and the second user.

3. The apparatus of claim **1**, wherein:

for at least one user of the social network, information relating to one or more user interaction patterns of the user with digital content over time includes a listening pattern.

4. The apparatus of claim **1**, wherein:

the recommendation engine provides the metric information in one of the following forms: a graph, and a pie chart.

5. The apparatus of claim **2**, wherein:

for each user of the social network, the recommendation engine is further configured to provide one or more recommendations for digital content to the user based on a set of metadata for the user and at least one set of metadata for at least one other user that is socially connected with the user in the social network.

6. The apparatus of claim **1**, wherein:

for at least one user of the social network, the recommendation engine is further configured to indicate one or more changes in one or more user interaction patterns of the user with digital content over time; and

each recommendation comprises one or more of the following: an audio content recommendation, a playlist recommendation, a radio station recommendation, a video content recommendation, an advertisement recommendation, and a coupon recommendation.

7. A computing cloud comprising:

a content store that stores multiple sets of metadata for multiple users of a social network, wherein each set of metadata corresponds to a user of the social network and comprises information relating to activity of the user and at least one digital content playlist including digital content accessed by the user; and

a recommendation engine comprising:

a first engine to:

provide at least one user of the social network with information relating to one or more user interaction patterns of the user with digital content over time;

based on the multiple sets of metadata, compare an at least one digital content playlist of a first user of the social network to an at least one digital content playlist of other users of the social network to identify a second user of the social network with a digital content playlist that most closely matches the at least one digital content playlist of the first user, and

generate a set of recommendations for the first user of the social network based upon a first set of metadata corresponding to the first user, a second set of metadata corresponding to the second user, and information relating to one or more user interaction patterns of the first user with digital content over time; and

a second engine comprising a social graph filter to generate a subset of each set of recommendations,

wherein for at least one user of the social network, information relating to one or more user interaction patterns of the user with digital content over time includes metric information identifying the one or more user interaction patterns.

8. The apparatus of claim **7**, wherein:

for each user of the social network, the social network provides at least one social connection between the user and at least one other user of the social network, such that each user of the social network is associated with at least one other user of the social network.

9. The apparatus of claim **7**, wherein:

for at least one user of the social network, information relating to one or more user interaction patterns of the user with digital content over time includes a listening pattern.

10. The apparatus of claim **7**, wherein:

the recommendation engine provides the metric information in one of the following forms: a graph or a pie chart.

11. The apparatus of claim **8**, wherein:

for each user of the social network, the recommendation engine provides one or more recommendations for digital content to the user based on a set of metadata for the user and at least one additional set of metadata for at least one other user that is socially connected with the user in the social network.

12. The apparatus of claim **7**, wherein:

for at least one user of the social network, the recommendation engine indicates one or more changes in one or more user interaction patterns of the user with digital content over time; and

each subset of each set of recommendations comprises one or more of the following: an audio content recommen-

dation, a playlist recommendation, a radio station recommendation, a video content recommendation, an advertisement recommendation, and a coupon recommendation.

13. A method for generating recommendations comprising: generating, at a computing device, multiple sets of metadata for multiple users of a social network, wherein each set of metadata corresponds to a user of the social network and comprises information relating to activity of the user and at least one digital content playlist including digital content accessed by the user;

providing, by a recommendation engine, at least one user of the social network with information relating to one or more user interaction patterns of the user with digital content over time;

based on the multiple sets of metadata, comparing an at least one digital content playlist of a first user of the social network to an at least one digital content playlist of other users of the social network to identify a second user of the social network with a digital content playlist that most closely matches the at least one digital content playlist of the first user; and

generating, by the recommendation engine, a recommendation for digital content to the first user based in part on a first set of metadata corresponding to the first user, a second set of metadata corresponding to the second user, the social network, and information relating to one or more user interaction patterns of the first user to digital content over time,

wherein for at least one user of the social network, information relating to one or more user interaction patterns of the user with digital content over time includes metric information identifying the one or more user interaction patterns.

14. The method of claim **13**, wherein:

the social network provides a social connection between the first user and the second user.

15. The method of claim **13**, wherein:

for at least one user of the social network, information relating to one or more user interaction patterns of the user with digital content over time includes a listening pattern.

16. The method of claim **13**, wherein:

the recommendation engine provides the metric information in one of the following forms: a graph or a pie chart.

17. The method of claim **14**, wherein:

for each user of the social network, the recommendation engine is further configured to provide one or more recommendations for digital content to the user based on a set of metadata for the user and at least one additional set of metadata for at least one other user that is socially connected with the user in the social network.

18. The method of claim **13**, wherein:

for at least one user of the social network, the recommendation engine is further configured to indicate one or more changes in one or more user interaction patterns of the user with digital content over time; and

each recommendation comprises one or more of the following: an audio content recommendation, a playlist recommendation, a radio station recommendation, a video content recommendation, an advertisement recommendation, and a coupon recommendation.

19. A method for generating recommendations comprising:

generating, by a computing device, multiple sets of metadata for multiple users of a social network, wherein each set of metadata corresponds to a user of the social network and comprises information relating to activity of the user and at least one digital content playlist including digital content accessed by the user;

storing each set of metadata corresponding to each user of the social network in a content store of the computing device;

providing, by a recommendation engine, at least one user of the social network with information relating to one or more user interaction patterns of the user with digital content over time;

based on the multiple sets of metadata, comparing an at least one digital content playlist of a first user of the social network to at least one digital content playlist of other users of the social network to identify a second user of the social network with a digital content playlist that most closely matches the at least one digital content playlist of the first user,

generating a set of recommendations for the first user of the social network based upon a first set of metadata corresponding to the first user, a second set of metadata corresponding to the second user, and information relating to one or more user interaction patterns of the first user with digital content over time; and

applying, by the recommendation engine, a social graph filter to generate a subset of each set of recommendations,

wherein for at least one user of the social network, information relating to one or more user interaction patterns of the user with digital content over time includes metric information identifying the one or more user interaction patterns.

20. The method of claim **19**, wherein:

for each user of the social network, the social network provides at least one social connection between the user and at least one other user of the social network, such that each user of the social network is associated with at least one other user of the social network.

21. The method of claim **19**, wherein:

for at least one user of the social network, information relating to one or more user interaction patterns of the user with digital content over time includes a listening pattern.

22. The method of claim **19**, wherein:

the recommendation engine provides the metric information in one of the following forms: a graph or a pie chart.

23. The method of claim **20**, wherein:

for each user of the social network, the recommendation engine is further configured to provide one or more recommendations for digital content to the user based on a set of metadata for the user and at least one additional set of metadata for at least one other user that is socially connected with the user in the social network.

24. The method of claim **19**, wherein:

for at least one user of the social network, the recommendation engine is further configured to indicate one or more changes in one or more user interaction patterns of the user with digital content over time; and

each subset of each set of recommendations comprises one or more of the following: an audio content recommendation, a playlist recommendation, a radio station recommendation, a video content recommendation, an advertisement recommendation, and a coupon recommendation.

* * * * *